Forest Management Conference

of

Pacific Coast Agencies

and

Proceedings of the

Western Forestry and Conservation Association

Sixteenth Annual Meeting
Victoria, B. C.
December
6-7-8-9
1926

Reprinted from
WEST COAST LUMBERMAN
Seattle, Wash.
December 15, 1926

Table of Contents

OFFICIAL PROCEEDINGS Sixteenth

Forest Land Management Conference and ~~Fifteenth~~ Annual Meeting of the Western Forestry and Conservation Association

Expanding normal fire organization to meet emergency situations; insurance of timber and reforesting lands; silvicultural and economic problems of private reforestation; getting more accurate fire damage figures before the public; and general correlation of effort by all forest agencies, were the chief and most controversial topics dealt with by over 100 representatives of private, state, federal and Canadian forest interests who, in the 1926 Forest Management Conference of the Western Forestry and Conservation Association met in Victoria December 6 to 9. The conference gathered the widest representation in its history since 1909. Besides the usual Pacific state agencies, men attended from the Rocky Mountain region, Washington, D. C., Eastern Canada, and New Zealand. Considerable disagreement developed in discussion, but harmonious compromise was reached in nearly all cases.

Report Session. Forest Management Conference

President A. W. Laird called the conference to order at 10:15 a. m., December 7. In his annual address he expressed the thanks of the American delegates in being able to again enjoy Canadian hospitality. He commented on many of the important oustanding activities, past and prospective, of the Western Forestry & Conservation Association, saying in part:

Annual Address of President A. W. Laird.

These annual conferences of all forest agencies have two purposes to fulfill. They cement us in the friendly co-operative relations so widely known as the successful basis of Pacific Coast progress in forest management, and they spur this progress by bringing our problems fearlessly to the front for exchange of differing views.

Those of you who have followed the meetings for seventeen years must be struck, just as I am, by the general progress from elementals, now so established as to receive small attention, to the far more complicated details with which we are now forced to deal. To begin with, we directed forest protection expenditures outside the national forests of only about $125,000 a year, whereas now we think we are lucky to get off with a million and a quarter. It is as likely to approach two millions. There has been equal growth in our acceptance of every responsibility of forest management, seemingly endless in their development of technical problems. And I think we can say that all agencies have done this together, losing sight neither of the part each must play independently and fearlessly, nor yet of the necessity for consultation and teamwork. This is the purpose of our organization.

Such a spirit and its obligations, beginning largely with more realization that great problems and responsibilities ahead can be met in no other way, leads gradually from the inspirational stage to actual analysis of the problems and then to the detail of solving them. Also through stages of solving some problems, so these can be given less attention, to the continuous discovery of new ones. Thus our meeting programs always display the overlap between the old and the new. We have with us the topics of routine follow-up, the stubborn old topics that puzzle us as much as ever, and always a new one or two to be either interesting or frightening.

There is not a man here who believes we have the fire problem whipped. The past year, especially in Idaho and Washington, has again taught the lesson California had in 1924; that excellent as is our organization to meet the normal hazard, it meets serious difficulties when careless man and abnormal weather combine to make conditions as bad as they can for us. We came through with great credit. Losses were trifling with what was at stake and with what would have happened without our protective organizations. But we shall not continue to deserve this credit unless we also use every lesson to do better yet next time. To reduce the number of fires to be dealt with, and to have better emergency organization, is the responsibility not only of each agency represented here but also of co-operative preparation to unite forces to the same ends.

The machinery our association maintains for such co-operation must be applied to this problem. It probably calls also for some further similar machinery within states, so local preparation and teamwork can be systematized. And I want to emphasize that as the United States is concerned, it is one more reason, among many just as urgent, that fail to get proper consideration, for realizing the importance of the Clarke-McNary law as a national policy. The principle applies less in Canada, to the extent that responsibility is more concentrated in provincial government, but with our triple division into private, state and federal responsibilities, and these considerably redivided, the whole fabric of forest protection and production depends for its strength on the interweaving this law recognizes and provides for.

The great importance of the Clarke-McNary law in this respect, and therefore of its support financial and otherwise by each agency in equitable proportion, is far from adequately realized. It is our national forest policy, expressed by Congress after long years of agitation and controversy, but not across as such in the public mind—not even in the government's own mind. As you know, a group of us had to go to Washington recently to show the several executive departments, from the president down, that in skimping provision for national forest protection, public domain protection, weather forecasts, and even the co-operation imposed by the law itself, the government has been doing less than any of the rest of us—on this coast at least—and so defeating its own aim.

We proved our case by showing what we are doing, but this situation calls upon us of the Pacific Coast, whose co-operative organization is more advanced than in any other region, to continue in every way to demonstrate effectiveness and progress. Here is the observed testing-ground of the co-operative principle versus the principle that public and private forest interests are inherently opposed and must fight each other to a finish.

Better fire organization is only one such opportunity. We must unite our several agencies, and unite the strength that lies within each of them separately, to apply the maximum of combined facilities and purpose to all unsolved problems. To this end it is necessary to appraise and face these problems. Certainly they include the following:

Reduction of fire hazard by more education and by far more vigorous and systematized law enforcement.

Handling of slash hazard as an individual operating system.

Thorough protection of reforestation areas.

The taxation problem.

Forest insurance.

Reproduction and growth habits of our tree species.

Present utilization with the latest loss in future utilization and land productiveness.

Insect and disease control.

The list might be longer, but at least these things must be recognized as of fundamental importance, as demanding more effort, and as incapable of being properly dealt with unless there is organized joint effort.

We join and support such for actual year-round accomplishment is the duty of every one of our agencies, of every member of the lumber industry, and of every citizen. To promote this realization, and the means of making it practically effective, is the purpose and responsibility of our alliance as represented at these conferences and also to the extent we can make it function every day in the year.

British Columbia Forestry Problems.

P. Z. Caverhill, chief forester of British Columbia, presented an address on British Columbia forestry problems. In his address he said, the principal forestry problem is economic, and the big thing is to raise the stumpage values. The tendency is to liquidate stumpage, increasing the output, placing the market in the hands of the buyers and still further complicating our economic problem, and resulting in enormous and unfortunate loss of wealth.

Continuing, he said:

Forestry, to be a success, must be based on the cold basis of economic fact. Yet we are using stumpage of a quality that cannot be replaced under any method of forestry, and it is returning one-half or one-quarter of the money needed to restock the area with a second growth, the quality of which, at best, will be similar to the small material now broken down and left on the ground as valueless after our coast operations.

It seems like a large order to increase the stumpage to $7 from the present $2 or $3 level, but such an increase would mean a 5 to 10 per cent increase to the consumer, and would very largely form a basis for the solution of many of our forestry problems. Is it not possible that such increase could be offset by improved marketing and distribution? Of the consumer, through a better understanding of grades, might meet his need partially from the lower grades, and in the end the cost would be no greater than is at present spent to supply their needs from present grades. So long as high-grade lumber in unlimited quantities and at low prices is offered, the consumer will demand that grade in preference to other grades of poorer quality. Unfortunately "no cow gives only cream" and no forest produces only clears. If 50 per cent of the wood crop is of sawlog material, the forester is satisfied. With a large local population the low grades are largely used for local construction and fuel.

British Columbia exports about 85 per cent of the products of her forest, much of this over considerable distances. Freight rates are 91 cents or 53 cents per hundred pounds, whether the material is clears, shop, or No. 3 common, and, when the freight charges approach the cost of production, the relative value of these grades changes materially from the time they leave the mill till they reach the consumer. The consumer may be quite willing to use the lower grades at a reduction of 30 per cent in the price. If this is only 10 per cent he demands the lumber of better quality. These lower grades are also in keen competition with second-growth lumber from the recutting of local stands.

This simply means that the Pacific Northwest is under a heavy handicap in marketing any but the higher grades and large-sized material. If railways could take into consideration relative value, giving a preferred rate to the lower grades, a tremendous step would be taken towards a solution of one of our most vital forest problems.

We have heard much during the past three years of the "blue ruin" cry, and yet the production and sales of timber are increasing. For British Columbia the returns for sawn lumber show production and value as follows:

1923—1,579,000,000 feet, board measure, value at $26.40 per M.

1924—1,601,000,000 feet, board measure, valued at $23.12 per M.

1925—1,687,000,000 feet, board measure, valued at $22.66 per M.

1926 will see a further increase in production and a corresponding decrease in value. Or take the offshore trade:

1923 shipments by water were 521,707,000 feet.
1924 shipments by water were 531,262,000 feet.
1925 shipments by water were 577,560,000 feet.
1926 shipments by water were 601,583,000 feet (for 10 months).

These figures indicate that there is a very satisfactory market for quantity. That the price is not satisfactory seems to be due to the desire that pervades the industry in general, viz., to liquidate stumpage without profit to the operator, and to keen competition for business, which puts the market control in the hands of middlemen and retailer. This again encourages waste increases the fire hazard, and hampers regeneration. The problem is economic, and the solution needs the careful thought of all those concerned with the development of our forest policy.

Concentration of Cut.

With the estimated stand of the province given as 350,000,000,000 feet and the cut, including local firewood, as 3,000,000,000, it would seem that we were in a safe position for many years. This cut, however, is more or less concentrated into the more accessible regions and even to species which find a more ready market.

Thus, in the Douglas fir belt of the lower coast, which occupies only 6 per cent of the forest area, we find the cut as follows:

1915—80 per cent. 1920—69 per cent. 1925—76 per cent.

In this region Douglas fir represents 40 per cent of the merchantable stand, but it forms the following percentage of the cut:

1915—44 per cent. 1920—53 per cent. 1925—50 per cent.

Old Officers Re-elected.

All the old officers of the Western Forestry & Conservation Association were re-elected as follows:

President.
A. W. Laird, Potlatch, Idaho.

Vice-Presidents.
Montana—W. C. Lubrecht.
Idaho—C. A. Barton.
Washington—E. G. Ames.
Oregon—George B. McLeod.
California—C. R. Johnson.

Trustees.
Montana—Walter Neils.
Idaho—Huntington Taylor.
Washington—George S. Long.
Oregon—George L. McPherson.
California—W. M. Wheeler.

Secretary-Treasurer.
C. S. Chapman.

In other words, we are depleting our stands fo Douglas fir in the Vancouver district at the rate of 2 per cent per year; cedar, 1.9 per cent; hemlock, 1.2 per cent; balsam, 0.5 per cent; while in the interior spruce is cut in the proportion of just over 0.5 per cent and lodgepole pine just under 0.5 per cent. These figures show conclusively the tendency to concentrate the cut where the greatest profit is to be secured. Forestry, on the other hand, requires a distribution of the cut in ratio to the annual growth. Our problem is to work for this distribution, in so far as possible, by making it possible to log these neglected species and market the product at a reasonable profit. Hence our market extension work and our studies in wood-waste recently undertaken.

Summary.

To sum up, then, we have:

1. An economic problem resulting in extravagant use of stumpage, values reduced far below replacement, concentration of cut, and coupled with this is the rapidly increasing demand from the world's markets, a demand which, if it continues, will deplete our original stands before the second crop is ready to cut.

2. We have a fire problem growing in intensity each year; the hope of solution being in the awakening forest conscience of our people—the adoption of the motto, "Care with Fire."

3. We have a tremendous problem in opening up and working out areas accessible for the practice of forestry.

4. We have a silvicultural problem that is at present an unknown element, and which requires a large amount of research work during the next quarter of a century. Indications are that nature favors us in the one item of regeneration. How about growth, thinning, and many other phases of a regulated stand? We know nothing.

Solve the economic problem, and you will begin to see the dawn. Solve the fire problem, and it is sunrise. Give us transportation, via good roads and trails, and it is the morning for the day of forestry practice.

FOREIGN VISITORS INTRODUCED.

President Laird at this point introduced Mr. A. N. Perham, State Forest Service, Rotorua, New Zealand, who outlined briefly a few forestry developments. He said that Pacific Coast of America species are doing best in New Zealand and hence his unusual interest in Pacific Coast forestry matters.

A. H. Graham of Quebec was also introduced. He represents five forest protective associations. He told of the problems in his region and touched upon a few methods employed in combatting forest fires.

Report of Forester-in-Charge E. T. Allen.

E. T. Allen, forester-in-charge, presented his annual report. The report follows in part:

One of the functions of this association, occupying a neutral field, is to force doubtful issues to the front and compel investigation and decision when without us this would be a much slower process. Each agency would incline to stick to its policy longer; all the more stubbornly if attacked by another agency. Our position, however, should be considered identified with none and championing none, therefore not only free, but actually constrained, to act on behalf of all to agitate doubtful points enough to stir up controversy and at the same time to promote and provide for their settlement in a constructive, amicable way.

This is what we try to do in silvicultural and economic matters dealt with by our research department, where there seems danger of too much dependence on old doctrines without fully and open-mindedly considering all the newer and wider evidence obtainable today. It gets more and better investigation by all and will eventually abide by the result.

I feel strongly that there is room for the same fresh outlook on fire prevention. It was inevitable that we should tend to develop some branches better than others and perhaps very dangerously neglect some that demand rather difficult confessions and revolutions. I have long felt this true of education and law enforcement, which we place nowhere near in their proper proportion to fire fighting for the simple reason that our fire-fighting organization naturally tends to preserve its first-established viewpoint. I now think it even falls down in a diametrically opposite direction by not learning a straight fire-fighting lesson which is forcing itself on us. We are too satisfiedly organized for the normal situation that we have learned how to handle and are not reorganizing ourselves sufficiently to meet the abnormal emergency. This remains a serious weakness in addition to non-success in reducing the number of fires to fight under such circumstances.

In other words, every branch of forest protection and forest production exhibits a constant evolution. Beginning in broad general principles, with the simplest and most obvious steps developed first in compromise blanket forms that the greatest numbers could be induced to accept, it shifts form and emphasis as weak links are discovered. Also, quite as significant, it breaks up into a specialized application to varied and changing local conditions. We advance in the measure that we recognize and promote this evolution of new forms.

An example is dealing with slash hazard, part equally of forest protection and of forest growing. We are just approaching intelligent solution of this vexed problem as we are realizing that almost every past contention on any side must be cast overboard as a possible general practice which can disregard differing operating conditions; that not slash, but hazard, is the point at issue, and that its adequate, economical removal is an operating problem as individual as any other. Once more forestry is no more the province of foresters than of logging superintendents, who are going to have to solve most of its problems even if not the first to propound them.

President Laird has referred to the importance of the Clarke-McNary law and you have been told that chances are bright for increased appropriation for fire co-operation thereunder. We should not lose sight of its other features. Promotion of better forest taxation is one of these and organization for this is now well under way. Forest insurance is another subject to follow. More important yet, in some ways, because it deals with the fundamental question of co-operative organization, is section one of the law which directs the secretary of agriculture to co-operate with other agencies in publicly recommending systems of fire prevention and suppression suited to the various regions of the country. This was begun this year, after considerable discussion, in which our forest policy committee took part, of the meaning of the words, systems and regions.

The interpretation which took guiding form is that system means the machinery for dividing the whole responsibility of all agencies, private and public, rather than mere method in the woods which is more a matter of administrative application as developed by time, place and change. And that region is mainly the suitable division, largely by states, to enable the best co-operative system. The co-operative relations already existing in our Pacific states were recognized as largely accomplishing the purpose of the law, so these has been little difficulty in creating committees to go ahead with the further recommendations necessary for public information, and this with small danger of any unfortunate friction.

The association was constituted by the Weather Bureau its official contact with western protective agencies to establish principles of co-operation in fire weather work.

The spark-arrester tests we turned over to the Pacific Logging Congress last December were given a good start during the season and we co-operated on the committee handling the project.

Pooled equipment-buying by the association was in greater volume than ever before, especially in weather-recording instruments for associations and logging camps, pumps, mess-kits, telephone supplies of all kinds, and standardized look-out houses. There was large saving in reduced costs to our constituents.

We issue a revised edition of the Western Fire Fighters Manual, also humidity tables based on elevation for use with weather instruments. General publicity material, also with reduced cost advantage, included the usual signs and posters, forest week posters, special roadside signs for reforestation areas, logging-camp no-smoking signs, and school-book covers bearing forestry lessons.

An interesting co-operative project tried out in Oregon was a lecture tour for which we furnished a motion picture and projector while state and forest service each contributed a speaker and his expenses. Audiences totaling 60,000 were reached, both adult and in schools. Enough duplicates of the film were sold in this country and Canada to cover its cost.

There was the usual service in appearing before congressional committees and various organizations throughout the United States where western forest interests required representation. Through the protection department assistance was given in the preparation of state tax measures and the workout out of Clarke-McNary law co-operation throughout our territory, while the research department, which will report separately, continued its service both to individual clients and in co-operating with other like agencies in studying regional problems of reforestation, slash disposal and the like.

1926 Fire Review and Lessons.

UNITED STATES.

R. H. Chapler, protection department of the Western Forestry and Conservation Association, read a report covering the 1926 fire losses in the five western states and analyzing lessons of the season. He said in part:

Total All Agencies—1926 fire season over the five-state area may well be referred to as mighty bad in spots. Southern and eastern Oregon, northern and northeastern Washington, Idaho south of the Salmon River and in the extreme north and northern Montana experieneced one of the worst seasons on record. Northwestern Oregon, except Columbia County; southwestern Washington; association territory in northern Idaho, except the Pend d'Oreille unit; and parts of Montana and California had a very favorable season.

In this five-state area there were 8,767 fires as against 10,573 in 1924 and 9,121 in 1925. The total cost of protection and suppression was $5,985,400, as compared with $5,169,000 in 1924 and $3,481,000 in 1925. This total 1926 cost is made up of $1,660,035 spent by state and private agencies, $151,665 spent on state and private land under the Clarke-McNary law and $4,173,700 spent on national forests. Of the whole amount, $3,110,500 was spent for protection exclusive of fire fighting, and $2,874,900 for emergency fire fighting.

The season's fire toll was 1,570,000,000 feet of mature timber lost beyond salvage. This amounts to 15/100ths of 1 per cent of the total stand. In addition to this over 1½ per cent of the total regrowth was destroyed, also 16,000,000 feet of logs, and there was a loss of $1,064,000 in improvements and logging equipment. The latter two items were covered partly by insurance. The total merchantable timber area burned over was 418,750 acres.

There were 3,160 men in the regular organization, which is equivalent to one man for every 40,300 acres.

Private and State Land Only.

Private and state land under protection in the five-state area amounts to a total of 56,984,500 acres. On this area, in 1926, there were 3,900 fires, which burned 131,400 acres of mature timber with a loss beyond salvage of 188,000,000 board feet. This loss in merchantable timber represents 3/100ths of 1 per cent of the total state and privately-owned stand. In addition to this 12,800,000 board feet of logs were destroyed. Other damage to improvements, equipment, etc., amounted to $186,000. The latter two items were partially covered by insurance. In addition to the destruction of merchantable timber, over 1 per cent of the regrowth on state and private lands was destroyed. The cost of emergency protection exclusive of fire fighting was $1,044,300, and the cost of emergency fire fighting was $767,900, making a total expenditure of $1,812,200, as compared with $1,384,800 in 1924 and $1,295,300 in 1925.

There were 751 convictions for forest law violations, compared with 329 in 1925. California leads in number of convictions for the past year, with a total of 363.

Total All Agencies by States.

Montana.

Fires 805
Merchantable timber area burned over..... 46,100 acres
Timber loss beyond salvage..... 251,000,000 board feet
Estimated loss in regrowth..... 3 6/10% of total
Expended for protection and suppression..... $1,132,000

Idaho.

Fires 1,670
Merchantable timber area burned over..... 96,350 acres
Timber loss beyond salvage..... 689,000,000 board feet
Estimated regrowth destroyed..... 2% of total
Expended for protection and suppression..... $1,882,700

Washington.

Fires 1,553
Merchantable timber area burned over..... 79,700 acres
Timber loss beyond salvage..... 127,000,000 board feet
Estimated loss in regrowth..... 1% of total
Expended for protection and suppression..... $912,300

Oregon.

Fires 2,230
Merchantable timber area burned over..... 76,400 acres
Timber loss beyond salvage..... 153,000,000 board feet
Estimated regrowth destroyed..... 1 4/10% of total
Expended for protection and suppression..... $967,000

California.

Fires 2,509
Merchantable timber area burned over..... 120,200 acres
Timber loss beyond salvage..... 313,000,000 board feet
Estimated regrowth destroyed..... ½ of 1% of total
Expended for protection and suppression..... $1,091,400

The areas protected by the forest service are in the main the higher lands, leaving the lower and more accessible areas under state and private protection organization. And there are inherent differences in the problem on the two areas, calling for different organization. On national forests the percentage of lightning fires sometimes runs up as high as 75. This year it was 52. On state and private areas the percentage of lightning fires seldom runs above 20. This year it was 17. This means that the national forest areas had only 48 per cent preventable fires and private state areas had 83 per cent. The organization on state and private areas has therefore by far the bigger educational and law enforcement problem in reduction of preventable fires. Whereas the forest service needs a larger regular organization to take care of unpreventable fires.

The percentage of salvable timber is low on national forest areas and high on state and private areas. This year 92 per cent of the timber killed on national forests is not salvable while only 47 per cent of the timber kiled on state and private land probably will not be salvaged. So far as merchantable timber values are concerned, the U. S. Forest Service organization needs even quicker and better organized effort than that on state and private lands because in the main its timber killed is lost.

Public Must Help.

The regular organization of the five-state area, consisting of 3,160 men, means an average of 40,300 acres to each man. In some places there is one man to every 7,000 acres, which means that some men are responsible for areas greatly in excess of 40,300 acres. This emphasizes the almost hopelessness of coping with the fire problem unless we have the full co-operation of the forest-using public.

Looking over statistics for past years it is not at all difficult to see that we are making organization progress year by year. For instance, it is reasonable to believe that before we had state laws requiring permits for slash burning, etc., a large proportion of those fires were listed as forest fires and entailed some expense. Certainly a considerable number of them got out of control and did damage. This last year we had a total of 8,767 fires. In addition to this there were 25,146 permits issued for burning and approximately 210,000 acres of slash burned under permit. Allowing 15 minutes of somebody's time for each permit (it probably averages nearer 30 minutes) this means that 6,300 man hours of the organizations' time were put in on this work alone.

Classifying Fires.

This last year there has been a very creditable and successful effort in California to tell the truth about forest fires. Quite a comprehensive classification is made showing forest fires, grass fires, watershed fires, etc. Probably the other four states would do well to work on a similar system although their problem might be somewhat different. In the statistics gathered this year forest areas burned over were divided into three classes:

1. Merchantable timber areas.
2. Potential forest land areas.
3. Other areas.

In the five-state area, over 90 per cent of the burned over area reported under "other areas" was reported from California. Considerably over 90 per cent of the total burned over area reported from Oregon, Washington, Idaho and Montana was listed as either merchantable timber land or potential forest land. The problem of classification in these four states, therefore, would appear to be rather simple. There might be just two, and not over three classifications.

Clarke-McNary Co-operation.

Under the Clarke-McNary law and under the policy as agreed upon by co-operating agencies, the federal government was to defray 25 per cent of the total cost of protection and suppression on state and private lands. Due to inadequate appropriations under the act it has not been possible for the forest service in administering the funds to provide the full federal share. This last year, under the largest appropriation which we have had to date, the federal government's share in Montana was 11 per cent of the cost, in Idaho 7 per cent of the cost, in Washington 8 per cent of the cost, in Oregon 6 per cent of the cost and in California 14 per cent of the cost. Over the five-state area the Clarke-McNary appropriation represented 8 per cent of the total cost.

Regrowth is being destroyed at the rate of over 1 per cent a year. This is the area where adequate protection is most expensive and in which the average owner has the least interest. When the federal government meets its full proportionate share of the cost we can reduce this loss materially.

Principal Organization Needs.

On the basis of this year's experience, as well as that of previous years, several organization needs should have special consideration:

1. Educational publicity.
2. Improved fire weather forecasts.
3. Better fire organization in logging operations.
4. More adequate prevention funds for the U. S. Forest Service.
5. Adequate appropriations under the Clarke-McNary act to meet the full 25 per cent federal share.
6. A definite protection policy on unappropriated public lands.
7. State legislation to encourage reforestation.

BRITISH COLUMBIA.

R. V. Stuart, British Columbia Forest Service, reported on the 1926 losses in British Columbia. The season was very severe, he said. The report said in part:

Summarizing the situation for the province generally, it may be said that the "fire season" was normal in the northern and coastal forest districts. The "southern interior"—in common with the northerly portions of Idaho, Montana and eastern Washington—experienced the worst situation in years. Conditions in the "Cariboo" and "Kamloops" forest districts were also extremely hazardous during July and August.

The total number of fires reported was 2,147, as against 2,521 last year; 2,174 in 1924; and 2,591 in 1922. Fires due to human agency (1,584) show a substantial reduction as compared with last year (1,889); and 1,867 in 1924.

Lightning was again responsible for a large percentage of fires, 563 being attributed to this agency; more than 400 of these fires occurred in the "southern interior" forest district. Lightning was the outstanding individual factor in British Columbia's fire situation this year. A single lightning storm, on July 12, set over 100 fires in the Nelson area; this—together with the condition of low humidities, strong winds, and high temperatures, that immediately followed, and recurred frequently until nearly the end of August—resulted in a fire situation unparalleled in this region in the last fifteen years.

The total fire damage bill this year, although impressively large, is substantially less than in 1925. The value of timber and other properties destroyed is estimated at $1,856,000, as against $2,745,000 last year. The total area burned over (620,000 acres), as against 1,023,000 last year. Merchantable timber destroyed this year is estimated at 230,000,000 feet board measure, as against 674,000,000 feet board measure last year. Valuable reproduction (188,000 acres), as against 634,000 acres in 1925. Fire-fighting costs totaled $501,000, as against $616,000 last year.

An analysis of statistics covering preventable fires, reveals percentages due to various causative agencies.

The only important increase is in the proportion and number of fires due to railroad operation (403—18.7 per cent), as against (337—13.4 per cent) last year. Campers and smokers were responsible for less fires this year—both percentage and number—than last year.

The number of fires due to logging is lower than last year. This is unquestionably due to the fact that more than 50 per cent of the logging operations in this province were suspended entirely during the danger period; and to the observance, by those who continued to operate, of extraordinary precautions. On the coast, practically all the larger camps that worked during July and August, operated on the early shift plan, and kept a close watch on humidity conditions, suspending operations when humidity fell below 35. It is significant that only three serious fires originated in logging operations in British Columbia this year.

Coming down to suppression accomplishments—42.1 per cent of the fires were extinguished under one-quarter of an acre; 34.1 per cent between one-quarter and ten acres; and 25.8 per cent over ten acres. The proportion of fires extinguished under ten acres (76.2 per cent) is the highest during the last ten-year period, with the exception of 1923—a year of comparatively low hazard—when 77 per cent were extinguished under this dimension.

In the face of the worst season experienced, with one hundred more fires than in any previous year—a higher percentage of fires, under the ten-acre limit, was extinguished than in any year during the last decade—except 1923—and loss in merchantable timber, reproduction and other forest products kept down to half of that of the year nearest approaching in hazard and fire occurrence, namely, 1925.

Summarized briefly, the outstanding items in the British Columbia fire situation this year are:

A substantial reduction in the number of man-caused fires, as compared with recent years of similar hazard.

Fire losses in area burned over, merchantable timber and valuable young growth—40 to 60 per cent less than in 1925. Fire-fighting costs reach the half million dollar mark, but are $100,000 less than 1925.

Lightning responsible for 26 per cent of fires, and the greatest individual factor in the situation; railroad fires increased; logging operation fires lowest since 1921.

Status of Reforestation Measures.

The program called for brief reports on the situation of cut-over land tax reform measures.

S. R. Black reported passage of the forestry amendment to the Constitution of California, at the last election. He said co-operation of all interested agencies put it over, at almost no cost for campaigning.

Dean Hugo Winkenwerder of Seattle had to report failure of the constitutional amendment in the State of Washington, but believed sentiment for it is strong. Further education is necessary to explain some features that were attacked.

Dean George W. Peavy of Corvallis, Oregon, had no action by people or legislature to report on but went at length into the principles of a bill to be submitted to the coming legislature by the State Reforestation Committee, which he does not personally support in full, and into the contrary principles he advocates.

Forestry Session. Forest Management Conference

Report of Research Department.

The report of the research department, submitted by Norman G. Jacobson, was followed closely, since in past years it has aroused some controversy. Extracts follow:

Our two Idaho projects this year were both very interesting as opening up new and important fields. Last year we suggested that too little attention had been given to the residual stand when white pine has been the principal species logged, and that in many cases the inferior species left may be the key to not only profitable forestry practice, but also to the slash problem and protection of the cut-over land. The Potlatch Lumber Company this year worked with us and have made a complete survey of their cut-over land. State Forester Bush added several men to the survey party and had the interspersed state cut-over land examined and classified at the same time. The Idaho forest school has helped to get growth data, which was practically lacking for such stands.

About 47,500 acres of company-owned land and 21,500 acres of state lands were examined. Of the company lands 31 per cent of the area has a stand of 114 and better of poles and trees 4 inches D. B. H. and over; 54 per cent of the area is fully stocked. Some is straight western pine land which when logged should produce cut-over land with a few seed trees and advance reproduction, but it is safe to say that with better slash disposal methods probably 75 per cent of the whole area would now be carrying a residual stand.

On much of the cut-over land, because of the residual stand left, a second cut of from 20,000 to 25,000 feet can reasonably be expected in 20 to 30 years after logging and this can be increased by leaving more of the small trees even in white pine at probably no actual expense or cost if the doubtful profit in small trees is balanced against what their removal adds to the fire hazard.

We hope that much more work along this line will be done, both in classification of north Idaho cut-over lands and in getting better growth for all of the species involved. We believe that such data will be exceedingly valuable to the operator in his determination of the company's policy, and also that it may contribute much to solving the slash problem, and in the end it will result in continual private interest in the co-operative patrol organization.

In South Idaho the Boise-Payette Lumber Company has taken the progressive position that with its large and well-located holdings interspersed with five national forests, together with the dependence of a large irrigation region upon forest protection, it is responsible for a thorough analysis of all protective, sylvicultural and economic angles bearing upon the final adoption of a co-operative plan which will result in permanent public service to the region served. The territory and the number of involved situations makes the problem too large for one season's field work to afford many definite or detailed conclusions.

The company has already ordered a change in its logging practice and is now leaving more small trees as a nucleus for another crop. We found that except on the badly burned over places this cut-over land is well restocked with seedlings and saplings. That practically all of the destructive fires of the past had occurred in fresh slash and not several years after logging. Nowhere in that territory did we find any amount of reproduction under 15 years old, which in itself indicated that restocking everywhere is slow and may be due to the cycle of dry years that it is now passing through. Competition between seedlings and the grasses is also very keen in that region. Since any plans that the company might make are more or less tied up with the proper land economic utilization of the national forests of that region, we co-operated very closely with the forest service which contributed a lot of thought and the service of its men to get a great deal of the badly-needed field work done.

When we last reported to you, our 1925 survey of the Grays Harbor region had not been worked up. This deals with another regional and type problem of great significance to the public as well as to forest owners. We found the region about two-thirds cut over. The cut-over lands when classified as to future production show tremendous possibilities but represent all stages from bare land with a 50-or-60-year wait for another crop to remarkable second-growth stands nearly ready to use again. The problem now is a regional one, but it is just what may be looked for in other regions when they become more nearly cut out. It is to bridge over the lean period 20 to 50 years hence when the virgin crop is gone and the second crop is not far enough along to furnish material for the industries now going. Protection for this period must be accomplished and financed in some way or there will be no crop and the region will lose its large resource. In this region there are also many forestry problems and studies needed before anyone can arrive at the best protection, slash disposal and definite forestry plans. In the fog belt you have species, growth factors, and reproduction habits that have had almost no attention, while the eastern edge, like the Hood Canal region, presents wholy different and also neglected possibilities of fir production on gravel lands. We did not do as much work on these subjects this year as we had hoped to, but expect to get at it actively again in 1927.

Meanwhile, through the progressive interest of the Clemmons Logging Company, we have been able to go quite thoroughly into the still different south edge of the Grays Harbor territory, where hemlock reproduction is rapid in getting started and is a real competition with fir, which in places is uncertain. Growth of both is exceedingly rapid and we find occasion here to study a tract logged some 15 to 20 years ago in which the fir and cedar had been taken out and the bulk of the hemlock and spruce was left. These stands now run from 25,000 to 40,000 feet per acre and in most places have dense understory of second growth of mostly hemlock mixed with an occasional Douglas fir or spruce sapling. Our prediction is that because of the increasing value of the mature hemlock and spruce now on the ground and the fact that the area is very accessible that it will pay to relog the ground in 15 to 20 years, perhaps sooner, and in the process of logging the stunted understory will be destroyed. Therefore for this area we can only see a slight increase in volume of the large trees and the beginning of a new crop and growth starting after the area is relogged.

Other projects have been mostly follow-ups in cut-over land classification, reproduction studies and slash hazard problems. Third-year checks on fir reseeding, and that of pine in favorable regions, corroborate our previous position that continuous restocking is usually dependable if protection is given, seed supply being less doubtful than conditions governing survival of seedlings. We also sustain our doctrine that removal of slash hazard is mostly a problem for local, even individual, operation solution, as various as conditions vary.

We believe that more than for any other one thing, it calls for the interest and ingenuity of logging superintendents to meet their conditions in this as they meet their other problems, with this backed up by sincere, dependable protective policy. Experiments along these lines such as the Fruit Growers' Supply, Potlatch, Michigan-California, Boise-Payette and Shevlin-Hixon companies are conducting in pine are particularly valuable because there is more controversy concerning pine. There is, however, considerable room for more experiment in some of the more unusual fir types and mixtures.

In closing, I would remind you that our work differs from that of most research agencies in that, since we also must advise our clients as we go along, we cannot always wait as long before declaring at least a temporary stand. We must give them our honest advice as best we can, as things look now, and continue to give all the benefit of every lesson from experiments. Above all, we want every other agency to give us constructive help with every problem confronted. This co-operation among all research agencies is as much an obligation on every one of us as it its co-operation in fighting a fire.

COMMENT ON JACOBSON'S REPORT.

S. B. Show, District Forester, California, led the discussion on Association Research. He said among other things:

"The research work of the association, covering important operations in the five states during the past three years has unquestionably been a factor of importance in interesting private owners in efforts to obtain regrowth on their lands. At the same time it has served as a useful check on findings of other agencies, particularly those of the forest service.

It is an encouraging sign to see the tendency toward conservative statement of new conclusions, for in the past there has perhaps been an inclination toward over-generalization and over-statement of working hypotheses.

One very much worth-while result of the work has been to emphasize anew the fact, well-known but often forgotten, that what is generally true in a region may not be so in a particular locality. For example there is little question that on most California pine lands the saving of advance growth is by far the safest method of insuring a new forest. But in specific places reproduction after cutting comes in readily, and the need for care of advance growth during logging and slash disposal is correspondingly reduced though by no means eliminated. In general it seems true that the association work has isolated the exceptions to previously approved forest practices rather than upset the practices.

An additional result of value has been focusing anew of attention on the ever present problem of slash disposal. An enormous part of the problem of growing new forests centers on correct handling of logging debris. The cost of such methods as piling and burning which adequately safeguard advance growth in the pine types, is a serious deterrent. Recently initiated experiments in pine, based on disposal of a minimum amount of slash, and intensive patrol of the balance, follow lines which should lead to rapid progress in this important field.

In most regions the associations' work seems to have strengthened and confirmed the conclusions of the forest service, that selective logging of one sort or another is good business practice, and an exceedingly important step in growing new forests. The work of the year in Idaho white pine, recognizing the future value of species now of little or no value, and the consequent desirability of saving rather than destroying them, seems a worth-while step in that direction.

The whole problem of analyzing the future value of cut-over lands is being greatly advanced by the progress in growth and yield investigation carried on principally by the forest experiment stations. The additional data obtained by the association on reproduction conditions on the operations studied points clearly to be used for more attention by all agencies to this great variable. Too much attention cannot be devoted to such studies, operation by operation.

The net results of all this work, perhaps especially the interesting of logging superintendent on the possibilities of regrowth is definitely in the right direction. The more of this we can have the better. I would once more emphasize, that as over-statement of forest fire damage is dangerous in the long run, so in my judgment is overstatement of the general application of new findings."

Restocking Habits.

FIR TYPES.

T. T. Munger, Director Northwest Forest Experiment Station, presented a paper on the Restocking Habits of Fir Types, saying in part:

"I would like to tell you now of some of the specific interesting things that are coming to light as a result of these studies that bear on the silviculture of Douglas fir. Last year I told you of some experiments in seed dissemination. That work has been continued and expanded. All the seed is not liberated with the first opening of cones but the dissemination is extended over several months. There is much good seed left in the cones after the brush-burning season. One test showed 13 seeds per cone on December 15, of which 18 per cent were good, seven seeds per cone in January, 16 per cent of them good, three seeds per cone in February, eight per cent good, and as late as April two seeds per cone of which 14 per cent were good.

The old textbook rule that adequate seeding takes place only to twice the height of the seed tree had better be checked before it is accepted here. One of our sets of seed catchers on the Clark & Wilson Lumber Company land extends out 2600 feet from the timber. From these catchers we learn the relative amount and absolute amount of seed that falls at various distances from its source throughout the entire season. These are underlying principles which we must first learn; knowing them it is easy to apply them to specific cases. The forester must avoid going to the expense of leaving seed trees or planting where a body of standing timber can be counted upon to do the seeding gratis. This year we have caught seed in quantity quite regularly up to 1000 feet, and the catcher at 2400 feet cut has had one seed in it so far.

Last winter we tried some actual tests in liberating winged seed from a kite and catching it on canvasses to get at the law of distribution under known wind conditions. With a wind at eight miles per hour on the ground most of the seed fell 800 to 1300 feet from the point of liberation, and some we know went beyond the last canvass at 1600 feet.

The phase of natural reproduction to which we have given the most attention this year is the factors which control germination and survival. The influencing factors are a combination of climate, soil, ground cover, competing or helpful herbage, animal enemies, etc., but as yet foresters have no rules for judging from inspection the favorableness of a site. Last year was a poor seed year in most of the fir region. The scarcity of reproduction this spring—where trees of seed-bearing size were within range—is the direct result of there being a scarcity of seed borne within the preceding twelve months. Going back into the records of some older plots we find that 1923 was an excellent seed year, that seedlings germinated very abundantly in the spring of 1924. Again 1924 was a slim seed year and the following spring new seedlings were scarce. This fall the cone crop was poor and on the strength of the facts I just gave I am willing to prophesy a scarcity of seedlings next spring on the land logged this year.

It was somewhat of a surprise to learn how early germination started in the spring. In a cool site in the Wind River valley the seeds were sprouting on March 15. (Of course 1926 was a very early spring.) A sprouting seed is very susceptible to heat or any disturbance. On that date in that place it is my guess that seeds near the surface of the ground would have been killed by the lightest slash fire. Perhaps spring slash burning, certainly late spring burning, may not be as advantageous to reproduction as we have sometimes supposed.

A practical question in the silviculture of Douglas fir is whether logged-off lands should be grazed or not. Grazing seems to lessen the fire hazard, it brings in a little revenue to the land owner to help pay his current taxes. Light and well regulated grazing need not be inconsistent with reproduction, provided it does not begin too soon after logging and bountiful nature has provided a few surplus seedlings that the sheep can destroy without impairing the forest crop. Heavy and unregulated grazing, on the other hand, can be exceedingly detrimental to reforestation.

If you want to draw any practical conclusions from the fragmental and preliminary set of facts so far established let them be these:

1. Insure to the land to be reforested a high degree of safety against accidental fires. Without that all other measures are of no avail.

2. Burn the slashing, unless the tract is of such a nature or so located that fire can probably be kept out. Remember that burning does not promote regeneration; hence if slash disposal is not necessary as a precaution against accidental fires it is silviculturally undesirable.

3. Provide a seed supply unless the land is to be planted or unless there is sure to be seed stored in the duff, which will probably be the case immediately following a good seed crop and a not too hot burn.

4. The seed supply may be provided either (a) From bodies of timber that will stand until after a seed crop not farther than 800 to 1000 feet, I will say tentatively, from the area to be reseeded. Logging alternate settings may sometimes be a way to accomplish this.

(b) From scattered conky or other trees of low value where such are present and can be left after logging.

(c) From sound seed trees, where no other methods are possible and it is cheaper to leave them than to plant.

5. After the reproduction is established allow the land to be grazed if it will bring in revenue and will lessen the fire hazard, but see that the stock are so handled that the damage to seedlings will not be serious.

6. Do not expect the same results every year on the same type of ground. There are two big annual variables—the seed crop and the summer weather. Either allow a sufficient factor of safety for the most unfavorable conditions or better yet, adapt the treatment to fit the seed crop and unfavorable weather.

7. Avoid blanket rules, but adapt the treatment to local conditions. The soils, climate and types of cover are very variable in this large region and the art of silviculture consists in recognizing these conditions and having the skill to devise treatments to satisfy their needs."

WHITE PINE TYPES.

Dean F. G. Miller of the College of Forestry, University of Idaho, read a paper on the Restocking Habits of Pine Types. He said in part:

"For the past several years the Idaho School of Forestry has been making studies of reproduction following old burns and of residual stands on logged-off land in the western white pine type. The purpose of the studies was not so much to determine methods of re-stocking as to emphasize the importance of preserving reproduction already established. As the merchantable timber was removed, the question arose in the minds of the owners of these stands of reproduction whether it would pay to continue to hold them and pay protection charges on them till they reached merchantable size. The stands on old burns studied ranged in age from 20 to 80 years, the average being about 40 years, and all the varying mixtures of species common to the white pine type were included.

It was found that average stands now 30 to 40 years old will produce annually an average of 400 to 500 board feet per acre for the next 40 to 60 years, 40 per cent of which will be white pine, and 60 per cent mixed species. These figures show these stands to have a very substantial value, and that failure to protect them would mean a heavy economic loss.

Residual Stands.

At last year's meeting I reported briefly on our residual stand studies, stating that such an investigation had been under way for three years, and that these stands would yield a profitable second cut in a relatively few years. We had not, however, included a study of reproduction under residual stands till last field season, on plots logged from 19 to 22 years ago. All of them without exception are abundantly stocked with reproduction that has come in since logging, the number of seedlings ranging from 4,500 to over 16,000 per acre. The average is 10,650 per acre, 642 or 2 per cent of which is white pine. Owing to the ability of white pine to surpass its associates in height growth, it will doubtless constitute a larger per cent of the final crop than it does now of the seedling crop.

Reproduction for the most part, if not entirely so, has come from seed borne by the residual trees and not from seed stored in the duff at time of logging. This is shown by the fact that there was very little reproduction for six to eight years after logging, and it is not at all probable that seed in the duff could retain its visibility for so long a period. In fact, reproduction even of white pine the first two or three years immediately after logging was very meagre. The logical inference is that the residual trees, suppressed as they were at time of logging, required several years of recuperation before bearing seed, and that since then reproduction has resulted from this source.

Existing residual stands in the white pine are largely those which have accidentally escaped fire rather than the result of any definite plan to preserve them, as they have not been recognized as having any potential value. Not only have our own studies proved the contrary, but our findings have been confirmed by residual stand studies made in the Idaho white pine belt by the Western Forestry and Conservation Association. These studies have awakened a decided interest in the possibilities of residual white pine stands, and doubtless plans of cutting to conserve them will soon become more general.

Cutting Plan of the Clearwater Timber Company.

In this connection I want to call attention to the cutting plan of the Clearwater Timber Company, of Lewiston, Idaho. This company is now opening up the largest contiguous body of white pine in the state. Plans for cutting call for a 12-inch breast-high diameter limit, and the slash is piled and burned as logging progresses. The company began logging the first part of September in second growth 80 to 100 years old that is cutting better than 40,000 feet to the acre, about two-thirds being white pine. Preliminary surveys by the writer indicated that with care in logging sufficient trees 11 inches in diameter and under would be left to furnish a profitable second cut in 35 years, the date when the company, for special reasons, would want to cut again. If the losses in these residual stands are as light as they have been in the stands studied elsewhere, the predicted cut in 35 years is around 12,000 feet, about 30 per cent of which would be white pine."

WESTERN YELLOW PINE TYPES.

E. I. Kotok, director of the California Forest Experiment Station, presented the re-stocking situation in California, saying:

"Jacobson and others have repeatedly pointed out that sweeping generalities as to the re-stocking habits of our western conifers are often misleading and frequently are inapplicable to specific localities.

This is particularly true of the western yellow pine in California, where it is to be found in a great variety of sites, differing essentially in the major ecological factors, namely, length of growing season, amount of precipitation and soil.

We have been following the history of 50 permanent sample plots on national forest cutting areas, some over 15 years old, and these observations give us a reasonable opportunity to state some tentative conclusions regarding the re-stocking habits of this important species. It is axiomatic that fire protection comes first.

1. The irregularity and infrequency of seed years is an outstanding feature throughout the range, and this, coupled with the lack of subsequent favorable climatic years, presents very obvious difficulties in securing ample reproduction. Frequently a period of 10 to 20 years may pass on the more difficult sites before reproduction can be secured.

2. Advance reproduction becomes a most important factor in procuring satisfactory stocking. The more difficult the site, the more important it is to safeguard advance growth if we are to secure maximum stands. In some of the plots under observation, we find that 53% of the young seedlings are advanced reproduction, and that after a lapse of 15 years, only 96%, as many seedlings are to be found as shown in the first observation.

Restocking in the Western Yellow Pine Region.

3. Ability of small-sized trees to produce seed, offers an excellent opportunity to re-stock yellow pine sites. Trees between 14 to 20 D. B. H. unprofitable to log, may very well form the basis of our seed trees. Our observation shows that 50%

of such trees may bear cones, and through this residual stand reasonably good stocking may be expected.

4. Rapid growth of advanced reproduction is an outstanding characteristic of the western yellow pine, and is an important consideration in calculating yields in our future stands."

BRITISH COLUMBIA RE-STOCKING STUDIES.

J. L. Alexander, British Columbia Forest Service, leading the discussion, said he agreed very closely with Mr. Munger. "British Columbia has conducted extensive studies and has found restocking has progressed quite satisfactorily, but as logging spreads out more dependence must be placed on seed trees or other methods of reseeding. Seed crops are irregular and not to be depended upon. Mortality is not great among seedlings after they get above the infant stage. The big problem is to determine definitely the number of seeds per acre to assure a good coverage. We are not getting as many opinions as we did a few years ago. We seem to be reaching common ground."

R. H. Weidman, Northern Rocky Mountain Experiment Station, Missoula, stated that he has found that new growth keeps on starting in new stands as long as 16 years after logging, the new seedlings coming up among the older seedlings.

Calculations for Owners of Cut-Over Lands.

An interesting discussion of the operator's view of the problem of re-stocking was presented by C. A. Barton, manager of the Boise-Payette Lumber Company, Boise, Idaho. His analysis of compound interest as a factor touched a widely disputed point. He said that after all the experimentation has been done by foresters, the problem must be eventually judged and handled by the timber owner from its economic aspects. Mr. Barton said in part:

"Forestry is an empirical art and not a mathematical science. The two major premises upon which it rests, namely, human needs expressed in consumption of forest products, and the vital forces of tree life in their reaction to the composite factors of site, including climate and soil, can be measured and predicted with only approximate accuracy. Yet upon these forecasts and appraisals forest finance must depend for its conclusions. This condition does not differ from that inherent in any other field of practical human effort dealing with dynamic forces.

With some of the things which I have expressed above in mind, I reached the conclusion that if the company which I represent was to go into the business of re-foresting its cut-over lands, it would do so only and when it had itself made a careful investigation and arrived at its own conclusions and not by what someone else had said. We are now making such investigations, which by necessity will require a number of years, but I believe when we get through we will have some facts from which we will be able to determine whether or not it is practicable, from an investment standpoint, to reforest our cut-over lands.

I wish to say to you, however, that no two situations are alike and each must be worked out in accordance with its own peculiar situation in mind.

Getting down now more concretely to my subject, namely, what are sound principles in figuring carrying cost interest rates, probable utilization, etc. We lumbermen have conflicting counsel, and this must be classified to meet our needs.

The cost of growing private forests cannot be reduced to any universal principle or formulae, and that is what makes it so discouraging. However, I shall attempt to call to your attention some of the things that in my mind must be taken into consideration. First of all, we have the item of land investment. There are several theories as to how this should be figured, possibly all of them more or less sound, but from the average business man's standpoint this should be figured at its disposal value after the virgin timber has been removed. The values of such lands will vary according to localities and conditions, possibly, from $1 to $10 per acre.

Second, we have taxes, and assuming that these will be assessed on the land at a nominal value, the annual taxes would probably range from 5 to 20 cents per acre.

Third, we have fire protection which is now ranging from 2 to 40 cents per acre. I believe we have a right to assume that as time goes on we will have better prevention and less fire fighting, which will have the tendency of bringing the minimum up and the maximum down. The three items mentioned I would call direct costs—or those which can be determined with some degree of accuracy.

For the sake of argument let us now assume that we have a going concern, with enough virgin timber back of it to continue in operation for 40 years under its present method of operation (I think you will agree with me that there are not many such concerns), which proposes to go into the business of re-foresting its cut-over lands. In order that the best results may be obtained it finds that it is absolutely necessary to change its logging methods and to leave a certain number of trees on the ground which, if cut now, have some value, and it must be more careful in slash disposal. It is obvious that this is bound to increase its yearly costs. If this is added to its present cost of logging it means that the concern will have less profit from the year's business. If such is the case then why should the extra expense so incurred not be charged to the growing of new forests? There are some who argue that in the case of a going concern with plenty of virgin timber, starting in to re-forest its cut-over lands for the purpose of perpetuating the business, that all such items of expense should be charged against the year's business and not be taken as a part of the expense in growing new forests. Also that no land value should be considered as a part of cost of new forest, as this was a part of the original investment and as such should so remain. Any good business concern under present day methods departmentizes its business, and all items of expense applicable to such department is charged against it so that it may know whether such department is profitable or not. If it finds that such department is not making money it is usually closed out. Why is not the growing of new forests, if undertaken, a separate and distinct department of such a business, and if so why should not all expense incurred by reason of same be charged against it for the purpose of arriving at cost? Most certainly if this is not done it must be deducted as a part of the expenses of the year's business and will simply reduce your income for that year by the amount of such expense.

If the items which I have mentioned are to be charged as a part of the cost of growing a new forest, then there are many things that must be taken into consideration before you can arrive at the correct figures to be used in order to be fair. Suppose we find that after a certain acreage has been cut taxes are increased on the remaining stand so as to take up the slack to produce enough revenue to meet the requirements of the political subdivision and the cut-over lands only assessed at a nominal value, the taxes on which only amounts to from 5 to 15 cents an acre per annum; my contention would be that no part of the additional tax on the remaining stand should be added to the cost of reforesting.

Take the expense of forest fire protection: Only such expense that is in excess of what would have to be expended anyway is chargeable to the cost of growing a new forest. After we have arrived at land value, taxes, and cost of protection, then we reach the item of interest, which, from the fact that so much has been said about it and no two people seem to agree, makes it look like a very troublesome question. From an accountant's standpoint interest is in no way a part of cost, but must be taken into consideration in arriving at cost value at the end of a certain period of time.

Aside from rate, which itself makes a tremendous difference in long-term calculations, the question is, whether compound interest applies at all. Some experts agree that it should be recognized in all carrying costs on the ground that moneys so expended if otherwise invested might earn it. We have those who admit the compound interest theory but say that a lower rate should be used. We have another group that holds that compound interest applies no more to growing forests than to ordinary timber investments which seldom earn it; that it should be considered as earning, if earned, more logically than a cost. In other words, that if you make a forest-growing enterprise carry 6 per cent compound interest and get out even, it has already paid well without any further profit on the crop. They also argue that after any such enterprise becomes self supporting so that money need not be borrowed, it is the current profit above current costs, rather than theorizing on alternative investments that might have been made, that determines the investor's satisfaction. In other words, that if at any date a portion of the second growth tract returns enough to repay prior cost with compound interest and thereafter other portions of the holding keep up a profit above all costs it is not necessary to reckon interest charges on any portions being so carried while awaiting cut.

Put it still another way: Should re-forestation calculations embrace compound interest at all, after the forest operation as a whole, including returns from old timber or any second growth when it becomes merchantable, is able to pay out while meeting carrying costs annually. Or is it correct to say any use of moneys for this purpose represents reduced current profits? Or should we not go this far, but still say they obviate the necessity of finding other capital and paying interest on it; also that if they do earn interest in growing trees they earn it instead of costing it.

Obviously one of the fundamental differences lies in whether the entire lumbering enterprise is regarded as a unit or is continually being redivided into acreage portions of differing financial status. Either viewpoint may be correct in theory. Regard lumbering, or any operation, in the abstract, as continuous and the interest charge does disappear; but regard the operation merely as an investment by stockholders to be continued only while it is profitable, and the situation may reverse. The practical question is how to regard it in any given case, which obviously depends on company policy, and this is determined by circumstances.

My own conclusions are these: That lumbermen are not necessarily committed to continue in business after they have liquidated their timber investment and used any second growth merchantable timber produced up to that time. That they desire to avoid all unnecessary forestry charges, thereby having that much more profit. I believe that every age class of second growth should be relieved of interest charges when it becomes merchantable and can yield a return to pay cost and interest charges. Then it starts again without the continued accumulation of compounding.

Putting it in a different way, my conclusions are these, and apply equally to a going concern or a concern that goes into the business of growing new trees: Costs should be arrived at along the lines which I have suggested and these costs at the end of the period of time will represent the direct costs of growing a new crop; then to arrive at cost value there should be added compound interest at 6 per cent up to the time that the new crops are ready to harvest. The interest charge representing what we have a right to expect to earn on an investment. You may say that 6 per cent interest is too high to be compounded over a long period of time, and I would say, "Yes,, such would be the case if there were not so many uncertainties as to the possible results." The government has recognized that 5¾ per cent is a reasonable yearly return on one type of long-time investment, namely, the railroads, and has authorized the Interstate Commerce Commission to fix rates that are expected to earn such return. Having arrived at costs, it then becomes necessary to consider the value of the timber standing on the ground at the end of the period. Also the question of utilization standard profoundly affects all conclusions.

The forester can approach accuracy in predicting growth and volume of wood obtainable at any future time, but what this amounts to in utilizable yield at that time depends on the minimum size of trees to be taken, how far into the top it will be used, and how the contents are figured. If board foot yield is to be the measurement it makes some difference whether we admit 8-inch trees or demand 12-inch trees, whether we figure 8-inch tops or 4-inch tops, and what log scale we apply in either case. In order that we may arrive at a conclusion it will be necessary to predict the future in the next 60 or 75 years and determine whether or not the market at that time will permit of the utilization of the smaller trees.

As to what log rule is used, I don't know that it makes any particular difference; values will be figured out based upon whatever log rule is used. In other words, if Scribner's decimal "C" log rule is used in determining the log feet it would naturally figure more value per thousand feet of logs than if the so-called "International" rule be used, as we would figure on a different basis, knowing that this rule practically eliminates any over-run."

DISCUSSION OF MR. BARTON'S ADDRESS.

R. H. Rutledge, district forester, Ogden, opened the discussion on Mr. Barton's paper, saying, among other things:

"The interest phase of this matter is of prime importance. The owner has a right to figure what his money should earn. But I feel we often start with too definite ideas on this question of interest.

"I feel this matter of compound interest is unfair to the whole proposition. I do not believe any agricultural, timber or mining venture should be put to this test. It has been said that all the money spent in an effort to obtain gold is far in excess of the value of all the gold that has ever been found or mined.

"I feel that economic laws will work out the values upon which we must handle this problem of growing timber. There are many variable factors to consider. Some method, I hope, will be arrived at that will reduce the number of these variables. One thing seems true, namely, that we will be compelled to consider more and more small logs. There will not be the wide range in log sizes that now exists."

Slash Hazard.

OREGON.

F. A. Elliott, state forester of Oregon, opened the question of slash hazard. He declared he was not an extremist on this question, taking the position, rather, that a reasonable policy should be practiced, one that meets the individual requirements. "The main thing," said the speaker, "is to dispose of the slash in such a way as to minimize the fire hazard so that new growth can be accomplished as speedily and as economically as possible." Continuing, he said:

"The primary object to be attained in slash disposal on potential forest land is, of course, reduction of the fire hazard. Methods, from the legal standpoint, must not result in the creation of a further fire menace. Hence a method should be worked out by a thorough study and understanding of local conditions by the operator and the state.

There is one fact that should be borne in mind when considering and carrying out slash disposal methods. Our present stand of timber will last for some generations. The new crop will probably never be the quality the present stand is, and hence will not represent the value the present one does, although to the consumer it may be more expensive. We do not want our judgment to be blinded by our enthusiasm and let methods of reproduction overshadow methods of protection and thereby risk the loss of not only the new growth but the virgin timber also by disastrous fires.

Inasmuch as slash disposal is primarily a protective measure, the main object to be attained should not be lost sight of in our efforts to save the potential forest. However, if the silvicultural requirements necessary to the production of a new forest can be met and a suitable margin of safety still attained when practicing slash disposal, obviously that is the proper thing to do. Protection agencies are practically unanimous in the opinion that it can be done.

There seems little opposition to the generally accepted system of broadcast burning in the Douglas fir region. Spring burning and fall burning each have their advocates, but I wish to state here that any operator who burns in the spring and then leaves hang-over fires to kick around all summer is not only laying up trouble for himself, but his neighbor also. Don't understand me as opposed to spring burning. I am not. Spring burning can be made safe through preparation beforehand and care afterward. I am in favor of burning slash whenever possible. We must take advantage of every opportunity.

No slash disposal is safe where the snags are left. More and more operators who are conducting their operations with a view to a second crop are cutting snags as a part of the logging operation. One company, I am told, intends going over several thousand acres of their cut-over land and fall the snags. Such falling should be made a part of the regular logging operation, and possibly by law.

In harnessing slash disposal methods and silvicultural requirements, the first thing to be considered in the yellow pine region is the new forest. The nucleus is the young growth remaining on the ground at the time of logging. This statement has been misconstrued by some to mean that protectionists are demanding the establishment of two forests prior to cutting—the old and new. Protectionists do not assume that that which has sustained a given growth of trees will support several times that growth. The whole idea is to protect the young growth—too small to be merchantable—which is almost universally found in the yellow pine forests. The method might better be called a modified selective cutting, bordering on a clear cutting system, thus thoroughly opening up the stand and releasing young trees to a more vigorous growth.

Methods Differ.

But coming down to slash disposal methods. They differ, of course, and mostly according to the responsibility of the operator. The most successful example we have is the system of burning and clearing of strips coupled with intensive patrol as is practiced by one or two Central Oregon operators. This, I believe, was pretty thoroughly explained last year and, if I am reliably informed, resulted in heavy losses the past year, in at least one instance. Such an operator, of course, places no burden upon the State Department. But between such an operation and the small irresponsible logger a series of conditions exist that range from conscientious cooperation to almost no effort whatever. For the majority of the operations we are advocating the system of spot burning the heavier portions of the slash area, cleaning up enough of the debris as to materially reduce the hazard. Voluntary efforts on the part of operators to follow the method have been the exception rather than the rule, and practically the only results attained were where our men were on the ground to assist and direct the work.

Our past fire season in the yellow pine region has been such as to make many operators and timber owners look askance at any slash disposal methods. For the first time in the history of organized forestry in Oregon, fires repeatedly crowned in the yellow pine timber. We heard mutterings of accumulated debris on the forest floor, brush and young growth, and also light burning mentioned in the same breath. I think that perhaps they lost sight of the fact that Eastern Oregon has gone through a five-year drought, with the result that moisture content of vegetation must have been far below normal. For a period of several weeks last season the humidity daily dropped to from 15 to 6 per cent, and even lower.

But we can take a lesson from this. Such abnormal conditions have prevailed and naturally can prevail again. So our protection methods must be directed to cope with abnormal conditions, rather than normal conditions.

We have another slash disposal problem in Oregon that is typically our own. Port Orford or white cedar, a special much sought for export shipment, seldom if ever occurs in pure stands, usually growing in mixture with Douglas fir. Owing to high prices paid for the logs, it can be logged at a profit where the less desirable fir would be handled at a loss. This has resulted in a selective system of logging, the cedar being removed and the fir left. Any one familiar with a fir forest can imagine the accumulation of debris following the logging of from 15 to 75 per cent of the stand, and also the impossibility of any broadcast burn without killing the remaining trees and making as bad a fire hazard as existed prior to burning. This is the condition facing us in the selective cedar operation. Either broadcast or spot burning is out of the question. The only system apparently feasible is a modified system of piling and windrowing. The government has also added to our trouble there. Considerable of the acreage is government land, administered by the Department of the Interior, and the timber is sold, the government retaining title to the land. The purchaser removes the timber and leaves his slash. His interest ceases. The hands of the state are tied, inasmuch as slash disposal, according to state laws, is the responsibility of the land owner and state laws do not apply to the federal government. The federal government says the owner must dispose of the slash but provides no machinery for enforcing this edict. The remedy lies with the federal government. Requiring the purchaser to furnish a bond would correct the evil."

CALIFORNIA.

Swift Berry, Michigan-California Lumber Company, California, reviewed slash disposal developments in California pine. He said in part:

"Slash from California pine forms a serious fire hazard the season of cutting, as the needles cling to the branches and are suspended in the air where they remain dry and very inflammable. Hazard decreases each succeeding season, because the needles and twigs drop off, are mashed down by snow and gradually rot, and return to the soil; so that after a certain period the hazard in a young stand of timber on cutover lands is about the same whether the slash was burned or not. From the standpoint of reproduction, the desirable method of slash disposal is one which removes sufficient slash to make the area reasonably safe during the first few years of fire hazard after cutting and yet destroys the least amount of advance reproduction and seed trees by broadcast burning. This happy medium appears to be accomplished by a combined system of spot and strip burning.

Each fall on the area cut on the Michigan California operation during the summer season, strips of slash 100 to 250 feet in width are burned along all logging spur grades, sometimes on the upper and sometimes on both sides. No work is done to prepare the tops, but each is burned as it lies. It is sometimes necessary to do some work to prepare fire-trails to control the burning, but these are made as simply as possible and advantage taken of logging trails. Thus the width of the strips is very irregular, frequently being over the limit mentioned above. On dry warm days the fire usually runs over the entire strip, but when the ground is wet the fire is pretty well confined to the area covered by each top, and spot-burning results.

Similar strips are burned on each side of any wagon roads within the area. Rather wider strips are spot-burned along ridge-tops and other favorable locations to divide the area of remaining slash up into suitable blocks within which the logging superintendent feels reasonably sure that any fire which may start can be controlled. On south exposures, where fire would be especially difficult to control, additional spot-burning is done.

The area cut over annually varies from 1000 to 1200 acres, and slash disposal by burning as described above is done on 20 to 25 per cent of this area. The proportion of the cut-over area covered should naturally vary depending upon local conditions existing upon each operation. The work the past three seasons has been done largely by year-long men who have spare time available after logging stops. For this reason satisfactory cost records are not available, but the cost is low.

Spring burning is not favored by the loggers, because of the probability of fires smoldering in down timber and giving trouble later in the dry season. Further it seems to have a better effect upon the carefulness of the men, if a lot of smokes are not allowed on the works in the spring. In order to avoid excessive damage to remaining young growth and to logging equipment it is usually desirable to wait until after the first good storm in the fall, before starting burning.

An important part of the system is the manner in which the burning is done. If excessive damage to young growth and high cost of control are to be avoided, the strips cannot be simply touched off and allowed to burn. To secure best results, each top burned should be lighted. Immediately after a storm when things are damp, they may be lighted on the lower side and allowed to burn up hill. As the ground cover and atmosphere becomes drier, the tops should be ignited nearer the middle, until on dry, warm days each should be lighted only on the upper side. Certain days it is desirable to refrain from starting any new fires during the middle portion of the day. When done with this care, the appearance of the area compares fairly well with burning of slash after piling.

During the past three seasons the experience of the company with this method of disposal has been satisfactory. There has been no difficulty in controlling fires on areas cut over in previous seasons."

IDAHO.

W. D. Humiston, Potlatch, Idaho, reviewed the slash problem in his state. "Idaho," he said, "had a serious slash hazard. The new state law aimed to compel the piling and burning of slash, except on written permission of the forester. This law has aroused much controversy among lumbermen, and will likely be a bone of contention at the next session of the legislature.

"Figures of our protective association show that for fourteen years 82 per cent of our expense of fire prevention has been on cut-over lands."

IN THE "FOG" BELT.

A letter was read from Alex Polson, Hoquiam, Washington, recommending that in the fog belt district no debris be burned. This policy, he wrote, would result in decay of debris in four to five years and give the seed in the ground an opportunity to come up and provide a good cover. All that is needed, he wrote, was for the counties to provide fire protection during the first few years.

J. H. Walker, Crown-Willamette Paper Company, Portland, Oregon, said fog belts were a protection, but the fogs do not come soon enough or at the right time.

"You can't reforest without burning," he insisted. "If you do not burn and you are able to kep the fires out, you won't have a uniform young stand. The debris must be cleaned first. Then you give the young growth a chance. As a general rule, log clean, burn clean. If the young growth does not come naturally, you can easily

plant the barren acres. Just think what wealth you can create in thirty years by planting a hundred acres of Port Orford cedar. It is a good idea to plant strips of alder through your cut-over areas. Snags must be cut. They should be cut as you log."

J. F. Kimball, Klamath Protective Association, said that the answer has not yet been found, but that in any event slash hazard should be removed by some method.

T. T. Munger said: "The Fog Belt issue is a debatable one, with good authorities on both sides."

N. G. Jacobson expressed the opinion that slash disposal could not be discussed in generalities, but rather in terms of local conditions.

James C. Evenden, United States Bureau of Entomology, Coeur d'Alene, said the question of slash has a relation to the insect and beetle problem.

Willis Corbett, Pacific Lumber Company, Scotia, California, said that slash burning spells safety for plantings.

President Laird, just before adjourning the Tuesday session, announced the committee appointments.

Protection Session. Forest Management Conference

Forest Legislation.

Forest legislation was the topic up for discussion at the opening session Wednesday morning. Reports as to possible legislative developments in the various states were made.

MONTANA.

F. E. Morrill, district forester, Missoula, said no steps have been taken looking toward new forestry legislation of consequence in Montana this winter.

IDAHO.

I. N. Nash, Idaho state land commissioner, stated that Idaho's new forestry law is in the main working very well, although a few minor changes will likely be proposed this winter. He asserted that the great diversity of conditions in Idaho make it difficult to completely satisfy all sections. The Idaho law compels the piling and burning of brush except by permission of the forester. This is objectionable to some, but Mr. Nash expressed the hope that all interests will eventually reach common ground.

W. D. Humiston, Potlatch, said some operators were opposed to the piling and burning features while others claimed it was an economical system. "From the standpoint of the private owner," Mr. Humiston said, "there is some kicking on the compulsory patrol feature. This howl comes from owners of cut-over lands."

These two features—compulsory patrol and enforced piling and burning—are likely to come in for some attention in the legislature this winter according to Mr. Humiston.

WASHINGTON.

George C. Joy, Washington state forester, said he anticipated but little forest legislation at Olympia except the reforestation legislation. Mr. Joy said a law is needed making it possible for counties to turn over to the state cut-over lands that have reverted on account of non-payment of taxes.

OREGON.

F. A. Elliott, Oregon state forester, reported that two reforestation tax bills will be presented in that state. He declared that as a result of this situation, it may be that no tax legislation will be enacted. He said that a few amendments to the present fire code will be suggested.

CALIFORNIA.

W. B. Ryder, deputy state forester of California, said:

"We feel that with our new law approved we have put over the big program. There may be some disputed minor points which will need changing, but in the main appear to be quite satisfactory. The old law needs a few amendments. The opening of the hunting season during the fire season creates a bad situation that ought to be remedied. I think the law should be arranged so that clearing up of donkey settings in the dry seasons might be prevented."

MONTANA AND IDAHO.

Fred Morrill said that the camp fire permit plan had worked very well in his district. Even the public, he declared, had accepted the permit and closing regulations realizing the need of such action. The tag system, the district forester stated, works well and does not antagonize the public as does the permit. Mr. Morrill said he was opposed to the absolute closing of national forests, except when absolutely necessary.

Forest Insect Control.

In view of the great damage that has resulted in Northwest lumber from insects, a paper on Forest Insect Control by F. P. Keen, United States Bureau of Entomology, was heard with unusual interest.

"Loss from insects," the speaker declared, "are enormous, rivaling or exceeding the fire losses. The insect problem is of vast economic importance, and must be reckoned with in a lumbering program." He said in part:

"The timber owner and forester is soon confronted with such problems as: "How can we afford to hold mature timber with taxes increasing on one hand and beetles annually killing from one per cent to four per cent of the stand on the other?" "How can we plan on a sustained yield if the beetles are apt to kill 25 per cent of the reserve stand in the first five years?" "How can we expect to reforest with swarms of insects descending upon our nurseries and plantations from adjacent forest areas?" From the seed to the mature tree, every stage of a tree's life is menaced by insects. Under such conditions how can we afford to stick our heads in the sand, ignore the insect problems, and expect to practice forestry, or even to save what we already have?

The owners of pine timber, while not committed to any statistics, realize that the insects cannot be disregarded. They have come to realize that even with the best possible protection from fire, much of their virgin pine land, instead of increasing in volume per acre, has been actually decreasing. They have found that what has been gained in the young growth has, in many cases, been more than offset by the loss in mature timber—timber which is of the highest quality and value. Since this timber represents their capital investment and chief concern, it was only natural that the timber owners should have been the first to recognize the importance of the beetle problem and the first to demand a remedy.

The suppression methods which were first suggested by Dr. A. D. Hopkins in 1906 have since been tried out on a great many small to large. Since these methods consisted of locating the infested trees and burning the beetles in the bark before they had time to escape, it is obvious that the methods would be effective in killing the beetles provided you could find them.

More recently several large scale projects have been conducted. In southern Oregon and northern California the private owners in co-operation with the Forest Service, Indian Service and Bureau of Entomology applied the methods to an area of over a million acres. During the three years of this work, between 1922 and 1925, over $150,000 of federal and private funds were spent and over 35,000,000 board feet of infested timber felled and the beetles destroyed. During the same period, the National Park Service and Forest Service spent $60,000 in treating 17,000,000 board feet of infested timber on the Kaibab Forest in northern Arizona. Between 1912 and 1922 the federal government and private timber owners spent $103,000 in the control of pine beetles in California. During the last four years $32,000 has been spent in the attempt to control the mountain pine beetle in the lodgepole stands of Idaho and Montana. What then has been the result of all of this work and what has it demonstrated as to the possibilities of controlling the pine beetles?

Outstanding Results.

Briefly, the outstanding results of this work are as follows:

1. That the present suppression methods are effective in holding down or reducing the beetle losses.

2. That the beetles cannot possibly be exterminated over large areas of virgin forest, and that as soon as the work ceases natural factors again became operative to bring about increases or decreases.

3. That the present suppression methods are expensive, and in view of the more or less temporary benefits, can only be profitably applied to timber of high value, which can afford the expense of a continuous suppression program.

It might be well to add that over most of the southern Oregon project the values were high enough to yield a margin of profit in timber saved over the cost of the work. Especially in years when the natural tendency was towards an increase in infestation was the effect of control most evident. On the Kaibab project similar results were secured and in the face of generally increasing infestation large savings were made on the treated areas. On certain of these projects, the infestation subsided following the control work and no further work was necessary, on other areas the beetles were kept suppressed only as long as the work continued and quickly became as bad as ever as soon as the work ceased.

Confronted then as we are with the expense and limited applicability of present control methods, what can be done to save our pine stands from this yearly depletion? Two courses of action are open.

1. To discover cheaper and better methods of suppression, or

2. To determine how these losses can be prevented, either through methods of forest management, or by some method of making the timber less susceptible to beetles attack.

The methods of suppression are still open to improvement. Cheaper methods of handling the crews, of bark burning or suncuring may still be devised. There is also the possibility of attracting the beetles to traps, or of increasing the effectiveness of their natural enemies. All of the practical possibilities should be studied. But we may soon come to the end of this road and must turn our attention to prevention. As Chapman, a noted ecologist, puts it: "The application of the principles of animal ecology is a field of economic entomology to which man must look for his protection in the struggle against his most serious natural enemy, the insect. Here, when entomologists have come to the limits of the possibilities of poisons and mechanical means of destroying the insects, attention must be turned in the last resort, to the possibilities of so modifying the environmental conditions that the pest can no longer plan a dominant role."

These are the problems now before us, but they will never be solved until timber owners and foresters in general become alive to the importance of the problems and demand adequate investigative work in their solution.

When the beetles can annually kill from one to four per cent of the mature pine stands; when in one year they may destroy as high as 25 per cent of the seed trees left on cut-over areas; when they wipe out large areas of young or mature timber; when they attack second growth stands and sweep down upon nursery plantations; it should be increasingly evident that all the fine theories of forest management, all the effort and expense of protecting forests from fire; all the efforts at reforestation will be of little avail unless the insect problems are taken into consideration and solved."

INSECT CONTROL WORK HAS PAID.

J. F. Kimball, Klamath Falls, discussed the beetle problem in southern Oregon. He declared the work done, even by crude methods, has paid. "The work," he said, "must be handled by experts. Beetle control is a very specialized business." One of the greatest experts in the world on this subject told Mr. Kimball that there were not more than sixteen men in the world who were real experts in beetle control.

"We need more experts of this kind," said Mr. Kimball. "The government should spend more money for this purpose."

Committee Named to Assist in Insect Control.

Mr. Kimball introduced a resolution asking that a large standing committee be named to obtain, if possible, more liberal government aid in insect control and extermination. This resolution was unanimously adopted. Later in the day, President Laird appointed the following to this committee:

Capt. J. B. Woods, chairman; R. H. Chapler, secretary; for Oregon, J. F. Kimball and F. A. Elliott; for California, S. R. Black and M. B. Pratt; for Idaho, Harry Shellworth and W. D. Humiston; for Washington, C. S. Chapman and George C. Joy; for Montana, Roscoe Haines and Rutledge Parker.

R. H. Rutledge, district forester, Ogden, Utah, emphasized the emergency feature of insect control. Appropriations for this kind of emergencies are difficult to obtain, resulting in added expense in being unable to combat a bad outbreak of insects at the time the fight might be waged most effectively and at the lowest cost.

N. G. Jacobson declared that insects can and must be controlled. "Healthy young growth must

be obtained," he said. "We must work with the entomologists. We must apply their recommendations."

Using Our Knowledge of Timber Disease.

An outstanding feature of the conference was a paper by Dr. J. S. Boyce, pathologist, U. S. Department of Agriculture. Dr. Boyce, at previous conferences, presented ideas of great value to western operators. His subject this time was "Using Our Knowledge of Timber Diseases"—practical application to leaving defective trees, judging timber, salvage of fire-killed material, etc. Dr. Boyce said in part:

"There is much contradictory misinformation regarding rot in Douglas fir. It could be concluded that decay was at its worst on any aspect of slope, in the bottoms or on ridges. The accepted outward indications of decay in the heartwood are many, some of them as valuable as the farmer's superstition of planting corn in the dark of the moon. As a result of all this it was generally considered extremely difficult, if not impossible, to estimate Douglas fir as closely as its associated species. Actually, decay is more easily detected in this species than in any other on the Pacific Coast.

In one locality one hundred seventy mature Douglas firs varying from sound to completely unmerchantable were felled, bucked, and split open from end to end. Complete diagrams were made of each tree showing the relation of decay to all the so-called indications on the outside of the tree. Detailed analysis of this data demonstrated that of the 45 per cent of the board-foot volume of these trees lost by decay, conk rot or red ring rot, caused by the ring scale fungus (Trametes pini), was responsible for 39 per cent, the remainder being accounted for by red-brown butt rot caused by the velvet-top fungus (Polyporus schweinitzii), brown trunk rot caused by the quinine fungus (Fomes laricis), and yellow-brown top rot caused by the rose-colored fungus (Fomes roseus). Furthermore, it was found that there are only two reliable outward indications of conk rot in the living tree, that is, sporophores or conks and abortive sporophores or swollen knots. The former are self-evident, while any observing woodsman, after training and experience, can learn to pick out the latter. All other abnormalities, such as burls, branch fane, many dead limbs, and so forth, are not in any way connected with decay. Sporophores or swollen knots of conk rot develop abundantly. In these trees less than 0.1 per cent of all the conk rot was not indicated in this way. Averages of the distance the rot extended above and below the highest and lowest sporophores or swollen knots in the trees were computed, so that it is possible to judge approximately the extent of conk rot in living trees. It was found also that the other three decays gave indications of their presence, but not with the consistent regularity of conk rot.

Estimating on a More Certain Basis.

With the foregoing information, estimating in defective Douglas fir can be placed on a much more certain basis. As an example, Norman Jacobson and the writer cruised a two-acre strip in a badly overmature, highly defective stand of pure Douglas fir. Each tree was carefully examined with field glasses for indications of rot, and the sound and decayed material recorded separately, using a volume table arranged by 2-inch diameter classes and number of 32-foot logs, which in addition gave the volume per log. By this method the 2-acre strip was estimated to carry 96,820 board feet of sound and 57,320 board feet of decayed timber, or a loss from decay, based on the gross estimate, of 36.8 per cent. Adjoining this strip a plot of felled and bucked timber, 2.36 acres in area, with trees averaging 53.5 inches diameter breast-high and from 300 to 340 years old, was carefully measured. The loss from decay in this plot, by actual measurement, was 41.4 per cent of the gross scale as compared to the 36.8 per cent for the adjoining area by estimate.

In addition, it should be possible to effect a material saving in felling and bucking charges on operations in defective timber. To demonstrate this, 10 trees judged to be wholly defective were selected on such an operation. These trees were then felled, bucked, and scaled. There was obtained 1750 board feet of log-grade, sound material, and the cost of felling and bucking was $22.51. On an area where there may be an average or two to three or more such trees to an acre, it would be worth while to have such trees left standing when not too near spar trees, since one man could pick out about 10 trees in two hours, costing much less than the felling and bucking. However, the responsibility for selecting defective trees must be placed on one trained man; to leave the choice to the fallers or head buckers is unsatisfactory. Sound timber is left standing.

Furthermore, besides reducing operating costs, these defective trees left will serve as seed trees. Two immediate objections may be raised to this. The first is that such trees will spread decay to the future stand. But as long as the present method of clear cutting Douglas fir prevails, future stands will be cut before the trees attain an age at which they become subject to extensive decay even though exposed to infection. This is proven throughout western Oregon and Washington by the stands of second growth Douglas fir up to 100 or more years old which are practically free from decay, even though old veterans, survivors of the previous stand, covered with living conks releasing billions of windborne infecting spores, are scattered through them. The second objection is that seedlings from seed produced by these diseased trees will be below average in thrift. But the present belief is that under certain conditions the majority of seedlings on cutover land come from seed dropped by the trees just previous to logging and by seeding in from the adjacent uncut stand. Of course much of this seed drops from decayed trees. More important still is the point that decay in Douglas fir attacks the mechanically supporting heartwood only, not interfering in any way with the physiological processes of the tree. It is difficult to believe that decay in the heartwood can affect the vital functions of a tree.

Periodic Rate of Increase.

Another point with a very practical bearing is the periodic rate of increase in the loss through decay. Such information would be of real value to holders and prospective purchasers of Douglas fir timber. It is well known from observation that young stands of second growth are relatively free from decay, but it is not known at just what age decay appears and how rapidly it increases subsequently, although there have been many conjectures on this last. An analysis of several plots in second growth stands in one locality in the Cascade Mountains of Oregon gave the following results:

Age Class Years	Average D. B. H. Inches	Volume of decay in per cent of tree volume, bd. ft.
60-80	19	0.0
81-100	27	0.3
101-120	28	1.4
121-140	31	5.3
141-160	38	6.6
161-180	41	7.4

Deterioration of Fire Killed Timber.

There is no exact information on the rate of deterioration of fire-killed timber, but two principles may be stated, so trite however that they are hardly worth repeating. The first is log the timber as soon after the fire as possible. Delay results in loss. The second is, the smaller the timber, the more rapidly it becomes worthless.

There are some examples that will serve as excellent illustrations, however. In the Cascades of Washington a fine stand of large, overmature Douglas fir was logged for 10 years after the fire before operations had to cease because the cut was then 25 per cent or less of the original timber on the ground. Another operation in the Coast ranges of Oregon in a mixed stand of Douglas fir, Sitka spruce, and western hemlock, fire-killed five years previously, was getting only 40 per cent of the original volume on the ground. The spruce and hemlock were already a total loss, Douglas fir yielding the only merchantable volume. Individual Douglas firs will remain relatively sound for many years. One small mill on the Olympic Peninsula in Washington obtained considerable sound timber from occasional trees fire-killed 20 years previously. Of course the volume remaining in relation to the original stand was negligible.

Deterioration of Western Yellow Pine Slash.

Turning our attention to the western yellow pine type in eastern Oregon and Washington, the method of slash disposal is one on which there has always been a wide divergence of opinion.

It has been found that the tops and cull logs were decayed very rapidly by western red rot caused by the fungus Polyporus allissianus. If the branches were left on the tops the decay also attacked them at the base, rotting them off and destroying the largest part of the branch. The small twigs also decayed rapidly. If the branches were lopped off, however, they were attacked only by a very slow-working decay which takes 10 to 15 years to destroy the thick part of the branch. Western red rot did not initially infect any piece less than four to six inches in diameter inside the bark because such small pieces dried out too quickly. The small twigs seemed to decay just as rapidly on the ground as when in the air. But most striking of all was the behavior of piled slash. A few brush piles made in 1913 and which had escaped burning were found. After 13 years the twigs and branches inside these piles were in the main practically as sound as when piled, with the needles still clinging to the twigs, and the wood at the breaks bright and hard. How long a yellow pine brush pile will last is problematical. Dr. Long estimates the life of a compact pile in Arizona and New Mexico at from 40 to 50 years, and his conclusion after his work in eastern Oregon was that decay was slower there than in the Southwest.

All of which means that from the standpoint of rapid deterioration, the best way to leave brush is as it falls, and the most advantageous method of logging is the one which will break up the slash least and avoid pulling it together in large piles."

DISCUSSION.

Considerable difference of opinion developed as to the leaving of slash. Several declared that lopping of slash, which may hasten decay of debris, nevertheless adds to the fire hazard, and minimizes the benefits that might accrue from the opposite practice.

Fire Session. Forest Management Conference

Fire Law Enforcement.

The important subject of fire law enforcement was discussed by C. M. Granger, district forester, Portland. Mr. Granger said in part:

"The criminally inclined seem to feel that their crimes, if detected, will not be punished.

"We have done much to punish violators of the forest fire laws, but we need to do more prevention work. We should endeavor to restrain those inclined to be careless. In some districts all tourists and hunters are cautioned to be careful and in some cases those entering the national forests are compelled to carry shovels and forest fire fighting equipment. We do not have so much trouble with willful violators as with those who are just careless. For these reasons I feel it is wise to have men in the forests along the road to caution travelers, and then to watch the campers and visitors, letting them know that they are being watched. We have trouble with hunters. This has been handled quite well in some sections. Progress has been made.

"We seem to be coming to a policy of concentrated camps and denial of the privilege of a camper going where he pleases. Then we must intensify the warning service patrol.

"Logging camp inspection is necessary. Operators on national forests must keep their equipment in readiness for immediate use. We should put men on the job where fires do break out in a logging camp on a national forest. This would assure of the work being done thoroughly.

"In my judgment those responsible for the fire should have to pay the cost of putting it out. We should have men available to develop a case while the fire is burning, or as soon thereafter as possible, before the evidence is lost or witnesses gone."

GENERAL DISCUSSION.

E. T. Allen said, "I have this matter very much at heart. We have had something like 8,500 fires this year. Probably 6,000 were man-caused fires. This year was the high water mark on convictions, and yet we convicted only about 10 per cent of the offenders.

"They don't have the fire problem in Sweden. They have practically eliminated fires. They are fire conscious. We don't have enough educational work, and yet we need more drastic action. Foresters are not policemen. You can't expect them to be. We need a fire constabulary in our forests. These men should be police officers. Some should wear uniforms, and some should be detectives. They must know how to catch offenders and how to handle evidence to convict them."

Tom Murray suggested that uniformed patrol-

men should patrol the highways through the forest fire regions. He said he felt such men would make a decided impression on tourists, campers, and others passing through the forests. He said he thought a half dozen men would prevent 2,000 man-caused fires in Western Washington alone.

George C. Joy endorsed the special law-enforcement officer plan. He said the foresters cannot do this work as it should be done. Next year the state of Washington will have four special law-enforcement workers.

R. H. Rutledge said, "The whole trouble with fire law enforcement is that officers are not hard-boiled enough."

Willis Corbett, of California, said, "Law enforcement is the thing. A few stiff fines will prevent more fires than anything that we can do."

Better Organization to Meet Bad Seasons and Bad Fires.

An extremely practical address was delivered by C. S. Chapman, Weyerhaeuser Timber Company, Tacoma, on "Better Organization to Meet Bad Seasons and Bad Fires." He outlined a plan for handling fires that might be adopted and followed by almost any logging operator. He declared enough is now known about fire fighting to enable a fundamental plan to be evolved. He said:

"There is no need for explanation of what constitutes our present system of fire protection in the northwestern country. Slightly different organization and different methods of procedure are necessarily in effect in different regions. The same general plan is, however, in effect, and, to my mind, in spite of certain weaknesses, has stood the test of time and will continue as the foundation of all future protection activity. I have no faith in cure-alls. The foundation must be a well-trained prevention, detection and suppression force of such size that the territory being cared for may adequately be covered and contact maintained with those living in or visiting the territory. It does, however, require refinement.

Suggestions for Betterment of Service.

Some time ago I took the liberty of writing a number of people, long experienced in forest protection matters, asking for suggestions as to how our protection systems might be improved. A number of excellent replies were received. Some of the suggestions I desire to mention and later discuss in some detail. They may be enumerated as follows:

Better organization for prevention and suppression in logging operations; more attention to the subject of slash disposal; maintenance of special fire-fighting crews; provision for better cooperation between different units of the same organizations, different organizations and operators in the furnishing of experienced men to cope with particularly bad situations; cooperation of operators in furnishing, during the winter season, employment for men engaged in protection work; training of the protection force through the medium of ranger schools or meetings; compilation of complete fire plans for each protection unit in which will be indicated particularly dangerous places, sources of man power, equipment and supplies; map and make known to wardens areas of especial fire danger and require that plans be made to meet any situation which may arise in such areas; conserve resources, so far as possible, until the peak of the season, and then add to the protection force wherever this seems desirable; impress the public with the importance of fire prevention through education and strict law enforcement; see that equipment, tools, telephone lines, etc., are all in order at an early date—in fact, have all necessary steps of preparation out of the way before the season opens.

We have all had these particular things brought to our attention in the past, and most organizations are attempting to put them in effect. They are mentioned because, as previously stated, it is my belief that greater attention to details, or greater refinement in our organizations, will go far toward making it possible more adequately to cope with our serious or unusual fire situations.

Operators' Fires.

Unquestionably some of the most expensive fires of each season originate in old or new slashings. These fires most often do the major part of their damage to machinery, down timber, railroad bridges and camps, rather than to standing timber. In the majority of cases, too, the operator handles the fire without expense to the forest protection agency operating in the region. Occasionally, however, cases occur where operators fail to handle their fires, and the task devolves upon the Forest Fire Association and state to look after the situation in the interest of surrounding owners of timber or adjoining operations. While this most often happens in the case of small and financially weak operators, sufficient difficulties are each year encountered with those not so situated, to make operators' fires a serious consideration of protection agencies. Laws and common practice have resulted in great progress along lines of logging camp protection, but this still offers a field.

Emergency Fire-Fighting Crews.

The forest service and other agencies have felt it worth while to keep available emergency crews of men capable of taking charge of serious fires or assisting in such work. When not on fires, these men are kept busy at trail building, telephone line construction or some similar work, but always where they may be readily available in case of need. This is a decided help and believed well worthy of the attention of those agencies not following the practice.

Fire Plans.

As a means of anticipating serious situations, there is much to be said in favor of fire plans. While every agency has within its organization men with full knowledge of areas of greatest risk, I doubt if many of them, aside from the forest service, have consistently made the greatest use of this information. Every man on a lookout should know just where the most hazardous sections of his territory are located. Every patrolman or warden in charge of a district should be fully informed as to the territory where fires are apt to be most serious. These men should be instructed that fires originating in or threatening such areas must immediately be reported to the proper authority and action at once started to control them. Even though responsibility for control does not rest primarily with the protection organization, its officials must have plans for control well in mind in case the responsible party fails to do his part.

A fire plan in graphic form, showing, for each district, areas of special hazard, and such other pertinent information as may be included, might well be in the hands of each warden. If then, in addition thereto, arrangements are made, so far as this is possible, for securing help and caring for them in case of fire, at least some preparation would have been made to cope with a bad situation, should it occur.

A More Flexible Organization.

Attention has been called to the possible added use of special fire-fighting crews and to possibilities, too, of added cooperation in the matter of different agencies supplying each other when possible with trained men to assist in the handling of bad fires. In addition to this, it is believed we may well work toward greater flexibility with each organization. The extension of a practice, to some extent in effect in Washington and presumably elsewhere, would perhaps aid in making available at least some trained men from each organization to assist in regions requiring such aid. I refer to the practice of having previously arranged with certain residents of a territory to temporarily, and when required, take over the duties of the local warden. Assuming that no fires exist in a given district and that the warden is an experienced fire fighter, he might well be relied by a less experienced man and thus, for a time, become available at a particularly dangerous place. This would involve advance arrangements but would, perhaps, serve quickly to make available a number of experienced men to cope with a particular situation. In this same connection, district or county rangers, or wardens, may well have it understood that some particular member of their force will take over their duties, should it become necessary and desirable that they devote considerable time to actually taking charge of a given fire. It is, of course, assumed that the head of a protection organization and such of his assistants as are available for this purpose will give every possible aid in emergency cases, but, as a rule, such men should not, if avoidable, be confined to directing operations on a single fire. Their greatest usefulness is in seeing that all bad situations are being cared for as well as circumstances and facilities permit.

To sum up, I believe we are warranted in going after the matter of preparation for the unusual season and unusual fires harder than this has ever been done in the past."

DISCUSSION.

The viewpoint of the forest service on the subject outlined by Mr. Chapman was given by Fred Morrell, who said the main problem is to meet the exceptional year. Experience of the past appears to show that provision is not made for the abnormal year.

"Too often," he said, "we do not have available equipment and supplies for emergencies and men in such cases are unorganized and do not work efficiently.

"The answer is, I think, more men for regular work, or, in other words, more and better preparation. We need men to head crews where emergencies develop."

Mr. Morrell expressed the opinion that the federal fire fighting organization shows just as great efficiency as that of private agencies.

President Laird assured Mr. Morrell that he know of no criticism against forest service policy or methods. All that the lumber industry wants of the government, according to Mr. Laird, is to provide funds to support the work more fully.

George C. Joy discussed this issue from the state's point of view. He said the state's activities are limited by the amount of money available, hence the state can do just so much and no more.

"When critical or abnormal situations develop, we are often handicapped," continued Mr. Joy. "We can save much trouble of an abnormal or emergency character by observing and heeding the weather warning."

Major Cowan added the viewpoint of British Columbia. He criticized the heavy labor turnover in fire prevention work, and the consequent loss of all previous training and experience. This, he said, was not true economy.

There are three main causes of abnormal trouble, according to W. B. Osborne, United States Forest Service. 'First, days of low humidity; second, a lot of fires caused by some special causes; third, one big fire. Every organization needs a number of trained, experienced leaders to handle emergencies. Such men should be available at all times to take charge in critical situations."

T. S. Goodyear stressed the importance of trained men in the organization, inculcating the right kind of theories and spirit.

F. Napier Denison, chief of the Canadian Meteorological work at Victoria, told of the cooperation of his service with the lumber industry and the public. He called attention to the fact that, according to averages, 1927 should be a wet year.

Logging Camp Fire Problems.

This topic, tying in with the previous subject, was presented by C. C. Scott, secretary of the Oregon Fire Patrol Association, Portland. His paper discussed the responsibility for costs as between operator and association, camp organizations, danger factors, etc. He said in part:

"Varying conditions and state laws in the area covered by the Western Forestry and Conservation Association probably make any uniform practice in the matter of financial responsibility for control of fires originating in active logging areas, impractical. There are, however, certain fundamental principals to which, it is believed, both the association and the operator should subscribe.

Association assessments for protection are based on pro rata acreage cost covering blanket risk. An area of active operation constitutes a risk at least from three to four times as great as the normal hazard covered by the blanket risk. Fire protection assessments are comparable to insurance premiums based on hazard. There is no more reason for an operator to ask an association, whose rate covers the blanket risk, to accept responsibility for control costs in his hazardous logging area than there would be for that same operator to expect an insurance company to give him the same rate for insuring his logs that they gave him for insurance on his residence property.

The man owning timber which is not being operated, often remote from active areas of operation, feels injustice is being worked on him if he is asked to pay assessments required to take care of fires caused by the operating timber owner who has an income from his property and is, supposedly, liquidating his investment.

Protection of an operation is, and should be, as much a part of the operation as felling, bucking or loading and should be the responsibility of the operator the same as any of his production activities. The chief difficulty we encounter in talking camp organization and protection with operators is that as a rule the cost of an adequate organization has not been figured in the cost of production and, since no allotment has been

made for such work, the operator usually figures that he can take a chance and get by. Too often he pays dearly on the gamble in heavy fire-fighting costs, loss in logs, equipment and disruption of operating plans.

Camp Organsization.

There is a feeling among many operators that the fire organization in the operation should be handled by the superintendent, which may be good as far as it goes if the superintendent is a man who is sufficiently fire conscious and can give to the details of the problem the time which they demand. We do not believe, however, that, on any sizable operation, the superintendent does have the time to give to the many little details which make the difference between the success or failure of the protection effort. The most successfully conducted protection organizations, on operations, which have come to our notice are those which have been in charge of a competent camp fire warden who is held responsible for results and has the complete backing of the superintendent and the owner in all matters pertaining to fire control in the operation.

The man in charge should have authority to select the men who work under him and he should be held responsible for the conduct of their work. The efficiency of his organization should not be impaired by a constantly changing personnel, which is often the case where the superintendent or foreman put on any man, as watchman and track patrolman, who can be spared from other branches of the operation.

In checking over our causes of fires in operations we find that a large majority of the fires which get away and cause the greatest loss and cost, are those which start in areas away from the center of the operation. Some of the causes of such fires are smoking, friction from line, foul blocks, blasting choker holes, blasting on railroad spurs, and that big cause, "we don't know how it started," which in all too many instances means that someone smoked once too often.

The Smoking Problem.

We have discussed the question of prohibiting smoking in the operation with many loggers, and we are surprised at the number who do not want to take a decided stand on this important matter. It seems that, because loggers have smoked in the woods some 40 years or so, the operator generally feels that he cannot encroach on what the logger feels is his personal liberties. In his milling operations smoking is strictly prohibited and the rule is enforced, yet the same owner may, and often does, allow smoking in his logging works where the risk is infinitely greater and his facilities for fire control infinitely less.

Insurance companies would not think of insuring a mill where promiscuous smoking was allowed. Why they write logging equipment without placing a no smoking clause in their policies is one of the many things we do not understand about insurance.

Choker holes must be blasted and stumps must be blown out of the right of way, but the operator who allows the use of fuse in such blasting, during the fire season, is not following good fire prevention practices. Fuse thrown by the blast may smoulder for hours before it breaks out. The danger from fuse is entirely eliminated by the use of electric exploders.

Probably one of the greatest contributing factors to the rapid spread of fire in logging areas is the failure of operators to properly dispose of their annual slash. It would be well for every operator to remember that under a supreme court decision in the State of Washington it has been held that the owner of land covered with slash which has not been removed in compliance with state law, is liable for damages caused by fire spreading from such lands. It was held that the owner was guilty of contributory neglect in not removing the menace to adjoining property.

Until operators figure that slash disposal is a part of their logging cost and make their plans accordingly, protection work in any intensively logged area, by both the operator and the association, will be under a serious handicap.

Do operators generally consider the fire problem as seriously as other production problems?

In every operation you find the high-priced hook tender to see that the logs keep coming according to schedule, the bull buck to see that falling and bucking is properly done, the logging engineer in charge of road construction, in each and every branch of the operation; in fact you find men experienced in their line, in charge. The cost of every one of these various branches is figured in the cost of production. When it comes to the question of protection from fire in the operation, which may wipe out the profits from all branches, we find, in too many instances, no special man in charge. With all due apologies to President Davis and Secretary Whisnant of the Pacific Logging Congress, we could not help but note, in reading the report of their most excellent meting held in Vancouver in October, the difference in interest displayed between papers covering production problems, methods and logging equipment and those papers dealing with spark arresters and camp organization and protection. Production problems in all cases produced lively discussion. Fire problems, it grieves us to say, produced no discussion.

How Far Should We Go?

How far should we go into the enforcement of laws pertaining to slash removal and fire prevention equipment?

The last two years at the meetings of the Western Forestry and Conservation Association we have listened to strong papers on the subject of law enforcement. We have been told that the protection game is as much a man hunt as it is a fire hunt; that we should have a special constabulary for the apprehension of that small outlaw minority who are still responsible for the bulk of our fire losses; that the man responsible for fire should be made an outlaw and so considered in his community. In conversation last week with a man who is unquestionably the best law enforcement officer in the State of Oregon, if not in the Northwest, he stated that he was positive that if, on August 1 of each year, he could visit all the lumbering operations in the state he could secure convictions on 40 per cent of the operators for some violation of the provisions of the state fire laws. That sounded strong but, after considering how, for a number of years, we have given the logger the benefit of the doubt on technicalities and have never done anything stronger than persuasion in regard to enforcing the provisions of the slash disposal law, I am inclined to think his statement was correct.

While there is a natural tendency on our part to tread lightly on the toes of the industry, as protection men should we not direct our efforts towards those hazards which each year give us our greatest losses? Most operators will respond as most of them have an honest desire to keep fire out of the operation. That small minority who will not respond but still follows careless practices, should be summarily haled before the proper authority to answer for its sins. One careless operator in any intensively operated area may nullify the best efforts of all of his careful neighbors.

It should not be necessary to take the initiative in securing the co-operation of operators in a movement to insure better protection practice in the industry. Their various associations and bureaus have the machinery to handle their own problems. Public opinion is a danger factor. When too large a percentage of fire loss comes from the industry itself we are in a rather unfavorable position in preaching care with fire to the general public. In the matter of our relation with the public and law enforcement we believe the Western Forestry and Conservation Association should subscribe to a policy which "hews to the line, let the chips fall where they may," to the end that the industry may be relieved of an annual fire bill, largely preventable, which it can ill afford."

DISCUSSION.

Discussion of Mr. Scott's paper was opened by C. G. Nagel, logging superintendent of the Potlatch Lumber Company, Potlatch, Idaho. He said his company has had little trouble with fires. While Mr. Nagel is superintendent, he personally looks after the fire prevention and suppression work. He has a very personal interest, realizing how a fire paralyzes a camp and shuts off the log output. Hence he endeavors to have no fires. He has accomplished this by careful organization and watchfulness.

George Joy called attention to this year's low loss of logs and equipment, probably due to a more careful attitude on the part of loggers.

George Johnson, Puget Mill Company, said he thought that during critical periods men should be kept in the camp instead of shutting it down. "In any event, eternal vigilance," he said, "is the thing. Everybody should be kept on their toes during the danger periods. I agree with Tom Murray that it is not always desirable to cease operating and let the men get away."

Recommend Prohibition of Smoking in the Woods.

Several speakers urged that smoking be prohibited in the woods. A motion expressing this idea was unanimously adopted.

Tom Murray emphasized the value of the camp fire warden. He said more thought should be given to planning ahead with a view to eliminating fires. He said he believed the time would come when some one, either a state official or a co-operative man experienced in such work, will plan logging operator's fire policies.

Insurance Session. Forest Management Conference

The So-called "Conflagration Hazard."

Major E. H. Bowie of the United States Weather Bureau, who from the outset displayed keen interest in this work, opened the insurance session Thursday morning by reading a paper on "the so-called 'Conflagration Hazard.' Do any grounds exist for fearing unprecedented and widespread danger conditions in the future?"

One of the outstanding activities of the Western Forestry and Conservation Association in recent years has been in having developed co-operation with the United States Weather Bureau. As a result of this work, most progressive loggers now look forward to, and act upon, the weather bulletins issued by the Weather Bureau during the forest fire season. A new feature has been getting the Weather Bureau to study the so-called "conflagration hazard" in the light of its bearing on forest insurance.

Major Bowie said in part:

"It may be taken for granted that the weather changes from month to month, from season to season, and from year to year. It also may be taken for granted that these changes are of such a nature that departures from averages tend to follow the so-called normals for the months, the seasons and the years. The tendency for weather to follow roughly a normal made up of the observed values for say a period of 50 to 75 years is a strong one, and while there are periods when the departures from the normal may be minus or plus quantities for some months, some seasons or even years, yet when these observed values of, let us say, temperature, rainfall, humidity and wind, are plotted against their normals, the fact stands out that there is always a strong tendency for these meterolological elements to preserve what we may term mean values.

Occasionally the stray from mean values is rather striking and persistent for considerable lengths of time, but records show that the opposite tendency will sooner or later assert itself and any deficit that has accumulated will in due time be offset by an excess. This seems so true and logical that it may be regarded as a law controlling the climates of modern and historic times. Climates have changed within the last several thousands of years, but the meteorologist asserts that the changes in the period covered by history have not been revolutionary and that there is a seeming tendency for the magnitude of changes to become less and less as the age of the earth increases. So long as the Pacific Ocean continues to bathe our western shores and there occurs no marked changes in the topography of the Continent, there is every reason to believe that the climate of the far western states will be essentially the same during the next seventy-five years as it has been during the 75 years just passed.

Short period variations from the normals are undoubtedly associated with the general atmospheric circulation which bring about alternately continental climatic and marine climatic types through brief periods of time. When the marine type is dominant the weather along our western coast is humid, overcast and cool, in summer and mild and rainy in winter, and when this gives way and the continental type comes on, it is as if for the time being our shore line had retreated westward, and we have all the characteristics of the climate of our inland region-low humidity, lack of clouds and fogs and rains, high temperature and desiccating winds—all combining to produce "fire-weather" of summer and the cold of winter.

Types of Weather.

There are times when for considerable periods the continental type is dominant and the fire-weather situation becomes and remains acute, and all fire prevention and suppression agencies work day and night to prevent, control and suppress fires. When every one feels the situation hopeless, Father Nature lends a hand, changes the course of the winds and brings relief. These

situations have arisen in the past and will continue to arise in the future. They will tax the efforts of men to prevent the burning of the forests, but there is no reason for believing that these efforts will not be successful. The forests were here when the white man came. They had undoubtedly been subjected to fires during the years before his coming and yet they survived. One may assume that previously the fires were less numerous but much larger than since lumbering began, but there is no reason to assume that the climatic conditions were different from what they are now.

The discussion at your conference at Victoria last year on the subject of timber insurance is recalled. From that discussion one was led to regard the problem as a two-fold one, which involves what may be called (a) normal hazard, appraisable through recorded evidence since fire weather conditions and fires and losses have been under reliable observation; and (2) a theoretical "conflagration hazard" of which little or nothing is known yet is traditionally a possibility. Foresters and protective agencies know that the worst Pacific Coast fires are associated with heat, wind and excessively low humidity, or that type of weather which I have classed as "Continental", and that such conditions at times obtain over a considerable area when they obtain at all. It is also known that evidence within our existing forests indicates that considerable areas have been fire swept in certain bad years prior to recorded history, suggesting that the fire hazard at those times may have been greater than now, and that such conditions of extreme hazardousness may possibly occur again, which with more slash and open areas, and more man-made fires may bring about a more dangerous situation than before the white man's occupation, despite the organized protection.

On the other hand such a deduction is only theory. The traceable severe prehistoric fires may have occurred under conditions less severe than those we know and with which we have contended without serious fire losses. Obviously bad weather conditions then found all lightning and Indian fires of the season still burning to be fanned up, for there was no protection. They may have been numerous and large. Furthermore, we are informed by foresters that compared with the general forest regions in which they occurred, even these fires were not extensive or connected, but spotty in a much larger area that escaped, which agrees with the meteorological fact that while the same dangerous weather influences may somewhat effect an area several hundred square miles in extent, it is not this that produces the most acutely dangerous situations. These are more local, resulting from some added local aggravation of general atmospheric conditions.

So if we recall the statement I have made concerning the relative stableness of the climate of the western states, and of the factors that make and control it, and that we have within the last seventy-five years experienced what we may regard as all possible extremes of heat, cold, dampness and dryness, we must conclude that the so-called "conflagration hazard" is something theoretically possible, but yet wholly improbable, and a factor that should be disregarded in determining fire risks in the forests of our far western states. Certainly the theoretical "conflagration hazard" is less probable in our forested areas than it is in our cities, and I assume that insurances companies disregard it in determining city fire risks."

DISCUSSIONS.

In reply to a question, Major Bowie said he did not believe the cutting of the forests had or would in any way affect the climate of the Pacific Coast.

George C. Joy disagreed with Major Bowie on one point, declaring that he feared that some time when there happened to be a lot of fires, and a bad fire weather, a conflagration will result.

Major Bowie said he believed the time will come when insurance companies will have a clause in their policies which will prevent collection for losses incurred in camps where operations are continued in the face of weather bureau warnings. He said that a clause similar to this is used in Great Lakes marine insurance.

Report of Insurance Committee.

Last year the association initiated a study of the insurance question. So much interest was aroused that a committee was named to continue the investigation. The committee submitted a report prepared by R. M. Fox, Portland, which was read by E. T. Allen. It follows in part:

"Your committee proceeded on the theory that about the first thing to discover is the amount of interest that exists. If nobody today really wants either to buy or sell forest insurance, we weren't going to accomplish much studying principle or detail of ways and costs of doing it. So our first plan was to approach both sides with a sort of feeler.

About four points occurred to us as best for first investigation, namely: The alleged conflagration hazard on which the insurance people want information; the general interest in the subject; the degree in which there is any real existing thought on details of rate and other terms; and the possible interest in insuring reforestation to protect carrying costs.

The conflagration hazard, since our interest might be considered biased, we turned over to the weather bureau, whose disposal of it as a ghost without substance is as gratifying as it is disinterested. The three points we left for ourselves we did not do so well with. In sounding general interest among forest owners, it was soon apparent that interest depends a good deal on what insurance has to offer—which is just what we don't know. If a questionnnaire put up a picture designed to look good to the owner it might promise what there is no chance of his getting. If it protected all the uncertainties that may occur to insurance people who are without much actual information on hazard and protection, it wouldn't elicit much interest among owners.

This difficulty merged points two and three so we could not get ideal questions and answers for either. The result of which was that many said "It all depends," or else didn't say anything, but filed the questionnaire or threw it away. However, we did send out several hundred questionnaires, reaching all prominent concerns in our five states, and a good proportion of the smaller ones. The result was disappointing numerically, probably for the reason I have just given—there was too much "it all depends" about it. I don't think it by any means represented so small a numerical interest.

Many replies had to be disregarded because they were indefinite or contradictory. Others really said something and these were evenly divided between interested and not interested. The same division held fairly true as between states. Those that were interested varied much in how far they committed themselves to anything, but it amounted to about this: That they represented about eigh hundred thousand acres, valued at about 54 million dollars for insurance, now ready to consider insurance on practicable terms.

Questionnaire Replies.

The spread was excellent, being around 243,000 acres in California, 200,000 in Washington, 163,000 in Montana, 86,000 in Oregon, 75,000 in Idaho, and 20,000 unlocated. Contrary to what insurance people might expect, this acreage is almost in reverse proportion to popular belief in regional hazard. Idaho has the smallest acreage; California the largest.

Suggestions as to reasonable rate varied from ½ of 1 per cent to 5 per cent. The average was close to 2 per cent.

Of twenty of the most intelligent specific valuations proposed by as many firms for insurance, the range was from $19,000.00 to $24,000,000.00, and the average was about two and a half million.

None of the above includes five proposals to insure reforestation on cut-over land in California, Oregon and Washington, totalling 111,000 acres. These were in answer to our question as to interest in insuring carrying costs on such land, rather than the undeterminable expectation value of the crop, usually unsalvageable in case of fire.

We did not approach any small individual owners. It was not so bad to learn promptly, with no agitation of the subject, of interest representing nearly a million acres, with excellent spread, and values of over $50,000,000. It is reasonable to suppose this could be doubled, at least, were there some specific satisfactory terms to offer.

We believe the situation is easy to analyze. It means forest insurances involves technical considerations from such distinct viewpoints that neither side alone can possibly devise terms that are satisfactory to the other or sound for itself. Such attempts as insurance companies have made prove this, so will any such attempts as we make independently. But proper co-operation would either succeed or fail in a way to settle the problem for us. We believe in trying it. That this conference should take such a stand and place it more formally than we have before the proper insurance authorities, with a view to accomplishing a joint expert conference that shall outline the needs on each side as then seem to require further study. If other co-operation, as from weather bureau, or from forest service under the Clarke-McNary law, will add to the picture or reduce expense, this can also be sought in connection with such a definite plan.

Some of the things that would likely be taken up can perhaps be foreseen from the experience of your committee. The volume and spread of business is susceptible of much more accurate demonstration, provided we know a little better what sort of terms are possible. We hesitated to spend the money and effort for a fuller canvass until this information is improved. Rate itself depends on other things that should at least be tentatively agreed upon, pending proof.

The Fundamental Question.

The fundamental question of hazard, and the related one of protected efficiency, are points on which insurance companies are admittedly uninformed. They lead beyond weather conditions to those of operation, patrol organization, state law, etc. That operated timber is a better risk than remote unoperated timber is not as well established as it should be. Very little operated timber is now a loss.

Degree of coverage is important. Insurance companies do not want to risk full coverage which invites giving them bad risks; large owners do not want to pay for it, knowing fire never injures all their holdings; protected agencies do not want to encourage its tendency to decrease safeguarding effort.

The subject of reforestation insurance is becoming a live one. That some species are nearly fireproof when young, while others are not; that tracts and types are susceptible of analysis of this sort, as well as of their protection and other conditions; that carrying costs capable of exact presentation may present a better value standard than the crop itself—these and other things unknown to insurance circles should be demonstrated.

Possibly there should be some changes in our systems of recording fires and losses, to develop fuller actuarial knowledge. Certainly hazard research should be continued. For whatever may be the terms of forest insurance when it is first established, they will become better or worse as experience teaches.

To sum up, we believe various economic pressures, including the financing of forest industry and forest production, are converging to make forest insurance a real issue; that forest agencies should anticipate this by continued systematic effort to develop sound information; and that it requires the co-operation of insurances interests."

NOEL DEW DISCUSSES INSURANCE.

Noel Aylmer Dew, Portland, discussed the problem from the insurance companies' viewpoint, saying in part:

"If it is true that you can tell the insurance world there "ain't no sich animile" as conflagration hazard, tell the insurance world and not merely content yourselves by telling a few companies or agents.

It must not be taken for granted that the insurance companies of the United States, Canada and Great Britain are not interested in giving your timber insurance problem that courteous and seriouscon sideration to which it is entitled. As a matter of fact you have never asked those great business bodies to consult with you. If you are seriously interested in applying for and buying timber insurance protection, it would appear to me you would get further if your association went directly to a similaras sociation of insurance companies, namely: The United States Fire Companies' Conference, 80 Maiden Lane, New York City, of which organization Mr. H. A. Smith is president. The officers and executive committeement of this conference are the presidents of such companies as The National Fire Insurance Company, of Hartford; The Continental of New York; The Home Insurance Company of New York; The Niagara; The Great American; the Hartford, and the Automobile of Connecticut.

When Mr. Allen goes east I suggest his arranging to meet President Smith of the United Fire Companies. It might lead to the conference forming a committee to meet a committee of your association. It is possible your association has already in its files the data that insurance companies would require for analysis; in any event your association could ascertain exactly the nature of data that would be reuired. The insurance companies would want VALUES, they would want companies would want VALUES, they would want VOLUMES; they would welcome your LOSS

tables covering a period of years and they would require this information segregated by counties or watersheds in all probability, and information as to particular "hazard areas." They would be interested in the result of your first questionnaire and would probably ask for a great deal more information than you probably possess, but I feel your association office would be glad to work out information sheets and helpful maps—if your office only knew just exactly what information was required and the forms into which the information should be plotted.

Now supposing this eventually led to the availability of timber insurance but that the insurance companies' rates and contract conditions did not meet with your general approval—you would still have the opportunity of forming a reciprocal association and handle the business yourselves, and incidentally you would then be in possession of the information which would permit your forming such a reciprocal association.

Permit me to emphasize my personal belief, you would be wasting your time should you attempt to work out this problem through one, two or three inidivdual insurance companies. There are approximately one hundred insurance companies involved in the western "log" pool. If you are going to apply for timber insurance individually or en masse ascertain FIRST whether your membership's joint applications would give a "timber insurance pool" a fair spread and sufficient volume, for without those two factors a "pool" could not offer you rates that would be acceptable to you.

I firmly believe forest insurance, that is, "standing merchantable green timber" insurance, and insurance for reforested areas will eventually be available to you. The result of the questionnaire is more encouraging than I anticipated. Much in the right direction has been accomplished."

W. B. Osborne said, "It is the dense new stands that are coming in everywhere that are the best fire stops we can have. They will be invaluable in checking fires and preventing great conflagrations. These strips of new growth are far better barriers than roads or rivers."

Tom Murray moved that the committee be continued. The motion was unanimously carried.

Giving the Public Facts About Fires.

There has been increasing agitation against misleading "forest fire" publicity. California this year endeavored to remedy this situation and met with considerable success. S. R. Black, California Forest Protective Association, read a paper to the conference on "Giving the Public Facts About Fires," saying in part:

"Has the public been getting the real truth about out-of-doors fires? Do 'Forest Fire' statistics show the actual facts? Technically perhaps they do, but in a broader sense they certainly do not. A large percentage of our so-called 'Forest Fires' do not burn up timber, and in some cases do not burn a single tree. The present system of carelessly labeling all out-of-doors fires as 'Forest Fires,' is therefore very misleading to the public, and to a considerable extent is injurious. Aside from the fact that in the long run it is poor policy not to tell the public the truth about the fire situation, there are some very definite reasons as to why the truth should be told, for the present system is doing immediate harm in several different ways.

I do not favor in any way minimizing actual losses. I do not favor publicity that would not tell the truth. But many eastern, as well as western, papers carry big scareheads and wild stories about western "Forest Fires" that have only the slightest foundation in fact. The point is, that with such stories in addition to true reports on the serious fires that do occur, it is quite doubtful that the large insurance companies will make any great effort to write timber insurance at a reasonable premium. On the other hand, if the actual loss by fire to commercial timber, less salvage values, were generally known, practical insurance of the risk should not be beyond hope.

The second place where damage is done by carelessness in the use of the term "Forest Fire," is the serious effect of such practice upon the sale of timber and timber securities. The bulk of timber bond holders can have little personal knowledge of fire conditions. Their opinion is formed largely through the medium of newspaper stories, or magazine articles. Unless such publicity is accurate and not misleading, it is not possible for the investing public to have a clear conception of the security of investments in timber or in timber securities.

Thirdly, the old system of reports tends to make the public careless, rather than careful, with fire in brush, watershed, and second growth reforesting areas. Americans think of "Forest Fires" as timber fires, and when one reads a story about a big forest fire, notices a warning about care with campfires in the forests, etc., then goes for a ride through some of the brush-covered watersheds, I doubt that he connects such brush with the "forest" he has read about. Until brush and watershed fires are called just that and not forest fires, much of the educational work in fire prevention is lost in such regions. The same thing applies to fires in our reforesting lands. Not one person in a hundred of the general public recognizes a young reforesting as a "forest" in the common meaning of the word. Consequently, fire educational efforts are lost so far as they apply to such areas. I believe we can bring about better fire prevention on reforesting and watershed lands by writing up the fires that occur in them in a language that the ordinary person can understand.

We have made a start in California toward greater accuracy in fire reports. That is, we have started to make a distinction in the classification of fires into brush fires or watershed fires and forest fires. Perhaps our method of doing so may be of interest to you. Our first move was to draft a resolution calling attention to the needs for distinguishing between the two classes of fires. To this resolution we secured the names of every important agency interested in fire prevention and forest watershed protection. Copies of the signed resolution were sent to all newspaper editors. The State Forester laid particular emphasis upon classifying fires in releases to the press, as did some of the forest supervisors. Whenever a reported "Forest Fire" was obviously a brush fire, and was improperly written up in a news item, a copy of the item and a copy of the resolution previously referred to were sent to the editor with the request that greater care be used in the future. We got very fine co-operation from the press which as a body sincerely wants to give facts to its readers. The main difficulty now is the small country correspondent who is paid on a space basis and writes up a little brush fire as a flaming forest fire in order to get a bigger story and incidentally more space. In addition there is the headline writer whose main aim in life is to write up catchy headings. "Forest Fire" is short, snappy, alliterative, and catchy and still the favorite of many writers. Overcoming these minor troubles is merely a case of persistent educational work which ultimately I think will bring results. The main source of trouble has been the source of news release. With state and federal agencies watching their releases, the bulk of news stories will become more and more accurate.

The logical thing for all the western timbered states to do is to get together upon a classification that is fair, and then go to the bat in getting it across in all news releases and statistics. By doing so they can render a very constructive service to the public, to timber owners, and to those trying to protect timber, brush and watersheds from the careless use of fire."

DISCUSSION.

The discussion was started by Theodore Shoemaker, United States Forest Service, Missoula. He read a paper outlining the forest service policy in fire publicity, saying in part:

"The time when forest fire news is read with the keenest interest is when the air is full of smoke. That is when the press, with its keen sense of what the public wants, is hungry for fire news, and is playing it up with big headlines on the front page. That is just the time also when all forest agencies are working night and day trying to put the fires out, and consequently are giving little thought to the publicity side of things. Detailed facts are not available and carefully prepared statements are out of the question. We are apt even to forget that there is an anxious public waiting for news of the struggle. Something ought to be done about it, for I believe that the public conception is effected more by this kind of fire news than by anything else. I am convinced that we cannot expect, after the fire season is over, to undo with any premeditated and carefully phrased statements the impressions gained at the time when fire news stands out in glaring headlines in the press of the nation.

Daily during the fire season the papers are calling on their correspondents in the vicinity of the fires for news. They call up the forest supervisor's offices, the state fire wardens, the lumber camps and protective associations and they take the press dispatches. The result is a long story under different place headings, and then, don't forget, it goes into the headline writer and is dressed up to catch attention. This all points to the need of seeking a better understanding with editors and headline writers. Just how far we can get with that I do not know, but I believe we shall find a sympathetic attitude and a real willingness to meet us halfway if we can really show that either the lumber industry or the cause of forestry is being injured by the sensational featuring of fires. It is just another of those jobs of seeking co-operation through personal contact and understanding, and I believe we shall succeed just as far as we deserve to succeed.

It has been charged by some that the statistics collected and disseminated by the Forest Service give misleading impressions,, and that thereby great harm has been done to the lumber industry. Specifically, fault has been found with our classification of fires. The topic I am discussing as assigned by the program committee intimates that fires should be classified as timber, reforestation or brush fires. I see no objection to this, but in some of the statements I have seen there is an apparent tendency to want to include only merchantable timber as forest-fires, and to relegate all other fires to a place of unimportance. I do not believe we should lend support to this idea.

Our grievance, if we have any, is due to the misuse of the figures rather than with the figures themselves. I can see where it may be quite important to California with her extensive brush areas, but in Idaho and Montana the percentage of non-forest land burned is so low as to be relatively unimportant from a statistical standpoint. In short the matter is local and will have to be worked out locally so far as the publicity end of it goes. On the other hand, if this group can offer some better form for keeping and publishing fire statistics, by all means let us do it. It will probably mean that private owners will have to make more complete reports than they have done heretofore, and when we get to placing full value on our fire losses I feel sure we will find that they have been underestimated rather than exaggerated."

COMMITTEE TO WORK OUT PLAN OF CLASSIFYING FIRES.

C. S. Chapman said the association proposed to name a committee to go into the subject of classifying fires for publicity purposes.

The report of the resolutions committee was made by C. S. Chapman, and unanimously adopted.

Conclusions of Standing Committees.

The day preceding the general conference was devoted to affairs of the association's standing committees on education and protection. About 50 were present, C. S. Chapman presiding.

Agreeing that the schools must be used to implant forest interest in coming citizens, the educational committee went at length into method. A sub-committee was created to study and report later upon opportunity to correct or add material in regular text-books used by children, while another will prepare a forestry reference book for teachers. Motion pictures in connection with lecture tours among schools were endorsed after considerable experience in 1926.

Concerning American Forest Week observance, it was recommended that effort be less diversified and center upon schools and the press.

Approval was given the plan of recreation manuals, giving useful information to travelers and sportsmen, and carrying fire prevention maxims, the cost covered by selling advertising space. The association was asked to guide form and make-up.

The protection committee discussed fire weather service, Clarke-McNary law co-operation, air patrol, equipment, methods and fire classification.

The first year's experience under an expanded program for fire weather forecasting brought out administrative difficulties which were largely ironed out. The coming year gives promise of producing even better forecast service than that afforded in the past. Air patrol was again endorsed as an auxiliary protection measure.

The importance of classification of fires so as to give the public a truer picture of their character was emphasized and a sub-committee was appointed to go into the matter of revision and standardization of fire reports.

In the discussion of new equipment, general commendation was voiced for the Washington Forest Fire Association and the State Forestry office for the excellent work done in development of a specially-equipped fire truck.

James Smart, of the Dominion service at Calgary, was asked to give the committee at this ap-

propriate time his equipment talk scheduled for a later place on the program, and led an interesting discussion of headlamps, such as miners use, for work on fire lines at night.

In the discussion of the Clark-McNary law, it was the opinion of the committee that the law contemplated larger appropriations and that the limited funds available, which had made it impossible for the government to recognize performance in the several state, as a basis for special allotments, constituted a serious obstacle to the substantial promotion of the purposes of the Act.

Forestry educational work in the schools and increased protection for immature forest areas were listed as the most important present needs.

THE ANNUAL BANQUET.

The annual banquet of the members of the Western Forestry and Conservation Association and the British Columbia Foresters was held in the banquet room of the Empress Hotel, Wednesday evening, December 8. Phil Wilson, president of the British Columbia Loggers Association, acted as toastmaster.

Only a few addresses were made, the principal one of which was delivered by Minister of Lands Pattulo, who complimented the foresters on their splendid and worthwhile accomplishments.

A. W. Laird, president of the Western Forestry and Conservation Association, responded to Mr. Pattulo, stating that the lumbermen, timber owners, and foresters were doing their best to perpetuate the forests, and to so manage this resource as to bring back an adequate return. He stated, however, that while a good start has been made, the work is still in the kindergarten stage.

Resolutions. Forest Management Conference

(1) Believing that under-statement and over-statement of forest fire losses are alike injurious to public understanding and welfare, we urge upon all forestry agencies and upon the press the desirability of obtaining and issuing the exact facts and recommend every agency to systematize its reports to this end.

(2) Insurance of timber and reforestation is as logical as insurance of other property resources, and lags mainly because of lacking interest and co-operation among insurance companies and forest owners. We hold both responsible for more active and organized effort and pledge our own facilities to this end.

(3) Progress in forest protection and forest management demands constant research and experiment to substitute individual responsibility and localized methods for blanket rules based on insufficient general information. We urge the acceptance and encouragement of this policy as the duty alike of lumbermen, foresters and public.

(4) The constantly increasing number of man-caused fires indicates need for greater prevention efforts. It is believed of greatest importance that each of our states develop an efficient forest constabulary to deal with law enforcement as a means of reaching the careless and criminally negligent minority of our population.

(5) We commend the effort in some of our western states looking to enactment of equitable laws governing the taxation of reforesting lands. It is of the greatest importance that legislation be enacted in all of them whereby owners of forest properties may be encouraged so to manage these properties that successive crops will result, and we pledge support to any effort which gives promise of practical results.

(6) Believing that educational work carried on by our various protection agencies has been of great value and that an extended campaign of this nature will result in a reduction of fire hazard, we again urge that private state, provincial and federal agencies devote more thought and money to reaching the public with material which will keep constantly before them need for forest protection and perpetuation.

(7) We urge a continuation of air patrol of the forested regions of the Northwest. The work of the past season was productive of excellent results and fully warrants Congress in providing necessary funds to continue and extend this means of fire protection and control.

(8) We further endorse the co-operative work of federal, state and private agencies to control forest insect depredations and destructive tree diseases, particularly white pine blister rust, and emphasize that heavy federal ownership in justice compels federal expenditure to meet co-operative programs agreed upon.

(9) Appreciating that progress in reforestation and the management and protection of forests is contingent upon technical research, we commend the policy of the U. S. Forest Service in establishing regional forest experiment stations, and hope for the expansion of these studies.

(10) The present status of insect depredations forcibly impresses us with the urgent necessity of immediate action in control and research. We urge our congressional delegations to call upon Congress to provide adequate funds for the Bureau of Entomology for the scientific study of insect problems in our western forests. And also to provide means whereby control measures on public lands of the United States may be conducted.

(11) As agencies actually engaged in forest protection and expending large sums therein, and basing our recommendations on competent knowledge, we urge upon Congress that federal appropriations as follows are absolutely necessary to complete a Pacific Coast fire control program which will be effective and toward which we ourselves are contributing in far greater proportion:

$1,250,000 for the promised federal co-operation with states under the Clarke-McNary law, to the success of which as a constructive forest policy measure in all except its federal support, we are abundantly able to testify.

$250,000 increase over present national forest appropriations to give fire preventive facilities approaching those given by local agencies to surrounding forest lands.

$75,000 for protection of forested public domain, now left largely to the care of non-federal agencies.

$25,000 to enable the Weather Bureau to give the information necessary for effective and economical fire control.

(12) We desire to express appreciation to the officers and members of this organization, who recently visited Washington, D. C., to explain to the administration the situation and needs of forest protection on the Pacific Coast.

(13)We desire to express appreciation of the hospitality which has been extended to us by our Canadian friends, as well as for the material aid given us in the conduct of our meetings.

FOREST FIRE STATISTICS—1926.

STATE AND PRIVATE AGENCIES.

STATE	Gross Area Patrolled, Acres	Contributing Acreage, Acres	Cost of Patrolling, Dollars	Cost of Fire Fighting, Dollars	Cost of Imprvmts. Dollars	Total Cost, Dollars	SEGREGATION OF COSTS: State, Dollars	Association and Private, Dollars	Federal Coop., Dollars	Forest Service, Dollars	NUMBER OF FIRES BY CLASSES: A under ¼A	B ¼ to 10A	C over 10A	Total Number Fires
Montana	4,450,000	1,900,000	24,300	5,200	4,500	34,000	3,200	22,700	7,600	500	142	47	53	242
Idaho	4,034,600	2,823,300	187,000	193,200	30,500	410,700	91,700	292,700	26,300	.....	234	132	76	442
Washington	12,000,000	7,150,000	184,500	195,300	11,700	391,500	87,900	277,500	26,100	.....	327	368	456	1,151
Oregon	10,000,000	8,500,000	348,000	164,000	24,300	536,300	41,400	†461,400	33,500	.....	236	431	461	1,128
California	12,500,000	7,600,000	54,600	54,100	25,700	134,400	80,200	24,200	30,000	.....	187	296	454	937
Totals	42,984,600	27,973,300	798,400	611,800	96,700	1,506,900	304,400	1,078,500	123,500	500	1,126	1,274	1,500	3,900

STATE	CAUSES OF FIRES—NUMBERS OF EACH: Lightning	Railroads	Campers	Smokers	Brush Burning	Incendiary	Lumbering	Miscellaneous	AREAS BURNED OVER: Merchantable Timber, Acres	Potential Forest Loss, Acres	Other Acres	Total Acres Burned
Montana	33	94	34	31	26	7	10	7	1,100	1,400	2,700	5,200
Idaho	235	24	40	27	45	13	28	30	15,100	45,600	3,000	63,700
Washington	126	81	157	199	105	68	85	330	43,000	174,600	30,000	247,600
Oregon	167	30	133	182	57	299	69	191	60,000	201,700	.....	261,700
California	31	56	37	272	122	98	1	320	12,200	36,400	336,800	385,400
Totals	592	285	401	711	355	485	193	878	131,400	459,700	372,500	963,600

STATE	DAMAGE M BOARD FEET: Timber Killed	Amount Salvable	Logs Destroyed	Damage to Improvements: Logging Equipment, Dollars	Other Damage, Dollars	Wardens, Rangers, Firemen etc.: Forest Service	State, Ass'n and Private	Convictions for Law Violations	Area of Slash Burned Under Permit	Number Permits Issued
Montana	1,100	50	.....	200	500	.....	104	4	400	38
Idaho	100,000	80,000	.....	11,800	8,600	.....	339	12	.....	237
Washington	69,700	52,300	10,200	98,500	40,800	.....	300	69	121,800	13,068
Oregon	199,300	66,900	2,400	362,000	111,100	.....	473	80	38,400	4,063
California	17,700	500	200	175,000	25,000	.....	31	118	43,900	510
Totals	387,800	199,750	12,800	647,500	186,000	.....	1,247	283	204,500	17,916

FOREST SERVICE AND BRITISH COLUMBIA.

STATE	Gross Area Patrolled, Acres	Contributing Acreage, Acres	Cost of Patrolling, Dollars	Cost of Fire Fighting, Dollars	Cost of Imprvmts. Dollars	Total Cost, Dollars	SEGREGATION OF COSTS: State, Dollars	Association and Private, Dollars	Federal Coop., Dollars	Forest Service, Dollars	NUMBER OF FIRES BY CLASSES: A under ¼A	B ¼ to 10A	C over 10A	Total Number Fires
Montana	17,550,000	16,750,000	296,000	508,000	‡394,000	1,098,000	32,000	66,000	.....	1,000,000	326	146	91	563
Idaho	21,333,000	20,358,000	285,000	792,000	‡395,000	1,472,000	.....	83,000	.....	1,389,000	837	234	157	1,228
Washington	11,800,000	11,600,000	75,900	307,300	‡137,600	520,800	3,300	32,800	.....	484,700	241	85	76	402
Oregon	16,700,000	16,600,000	126,800	118,800	‡185,100	430,700	5,400	9,800	.....	415,500	613	361	128	1,102
California	17,500,000	17,500,000	235,000	537,000	‡185,000	957,000	.....	73,000	.....	884,000	666	499	407	1,572
Totals	84,883,000	82,808,000	1,018,700	2,262,600	1,196,700	4,478,200	40,700	264,600	.....	4,173,200	2,683	1,325	859	4,867
British Columbia	125,000,000	125,000,000	377,000	502,000	21,700	900,700	.....	.....	.....	.....	904	732	511	2,147
Grand Totals	252,867,700	235,781,300	2,194,100	3,376,600	1,315,100	6,885,800	345,100	1,343,000	123,500	4,173,700	4,713	3,331	2,870	10,914

STATE	CAUSES OF FIRES—NUMBERS OF EACH: Lightning	Railroads	Campers	Smokers	Brush Burning	Incendiary	Lumbering	Miscellaneous	AREAS BURNED OVER: Merchantable Timber, Acres	Potential Forest Loss, Acres	Other Acres	Total Acres Burned
Montana	329	39	36	90	22	13	15	19	45,000	70,000	5,000	120,000
Idaho	931	14	86	99	52	9	5	32	81,250	152,000	2,750	236,000
Washington	192	16	72	74	16	4	13	15	36,700	31,500	52,900	121,100
Oregon	497	68	175	195	22	78	9	58	16,400	9,300	2,900	28,600
California	519	162	128	409	39	146	50	119	108,000	100,700	340,900	549,600
Totals	2,468	299	497	867	151	250	92	243	287,350	363,500	404,450	1,055,300
British Columbia	563	403	323	236	155	70	105	292	57,900	188,900	372,500	619,300
Grand Totals	3,523	987	1,221	1,814	661	805	390	1,420	476,650	1,012,100	1,149,450	2,638,200

STATE	DAMAGE M BOARD FEET: Timber Killed	Amount Salvable	Logs Destroyed	Damage to Improvements: Logging Equipment, Dollars	Other Damage, Dollars	Wardens, Rangers, Firemen etc.: Forest Service	State, Ass'n and Private	Convictions for Law Violations	Area of Slash Burned Under Permit	Number Permits Issued
Montana	250,000	.....	.....	.....	1,000	325	.....	32	.....	.....
Idaho	754,000	85,000	2,000	2,000	4,500	440	.....	9	.....	.....
Washington	128,300	18,800	.....	.....	4,500	272	.....	84	4,500	88
Oregon	78,900	21,000	200	2,200	1,020	466	.....	98	3,700	1,022
California	296,000	90	750	20,000	196,000	410	.....	245	.....	.....
Totals	1,507,200	124,890	2,950	24,200	206,500	1,913	.....	468	8,200	1,110
British Columbia	334,300	105,000	117,200	321,800	289,800	298	.....	43	9,500	7,230
Grand Totals	2,229,300	429,640	132,950	993,500	682,320	2,211	.....	794	222,200	26,256

TOTALS BY STATES.

STATE	AREA UNDER PROTECTION: State and Private	National Forest	Total	COST OF PROTECTION EXCLUSIVE OF FIRE FIGHTING: State and Private	Federal Coop.	National Forest	Total	COST OF FIRE FIGHTING: State and Private	Federal Coop.	National Forest	Total	TOTAL COST: State and Private	Federal Coop.	National Forest	Total
Montana	6,100,000	15,900,000	22,000,000	63,330	15,470	540,000	618,800	53,200	.....	460,000	513,200	116,030	15,470	1,000,500	1,132,000
Idaha	6,268,000	19,100,000	25,368,000	213,090	37,410	647,000	897,500	243,200	.....	742,000	985,200	456,290	37,410	1,389,000	1,882,700
Washington	13,899,000	9,901,000	23,800,000	181,780	33,220	194,700	409,700	212,600	.....	290,000	502,600	394,380	33,220	484,700	912,300
Oregon	*13,500,000	13,200,000	26,700,000	344,905	34,595	304,700	684,200	172,000	.....	110,800	282,800	516,905	34,595	415,500	967,000
California	16,800,000	13,000,000	29,800,000	89,530	30,970	379,800	500,300	86,900	.....	504,200	591,100	176,430	30,970	884,000	1,091,400
Totals	56,567,000	71,101,000	127,668,000	892,635	151,665	2,066,200	3,110,500	767,900	.....	2,107,000	2,874,900	1,660,035	151,665	4,173,700	5,985,400

STATE	Lightning Fires: State and Private	National Forest	Man Caused Fires: State and Private	National Forest	Grand Total Fires	AREAS BURNED OVER: State and Private	National Forest	Total	Regular Seasonal Protection Force: State and Private	National Forest	Total
Montana	33	329	209	234	805	15,200	110,000	125,200	132	297	429
Idaho	235	931	207	297	1,670	102,200	197,500	299,700	370	404	779
Washington	126	192	1,025	210	1,553	264,500	104,200	368,700	320	252	572
Oregon	167	497	961	605	2,230	267,400	22,900	290,300	485	454	939
California	31	519	906	1,053	2,501	515,400	419,600	935,000	76	365	441
Totals	592	2,468	3,308	2,399	8,767	1,164,700	854,200	2,018,900	1,388	1,772	3,160

	Convictions for Law Violations: State and Private	National Forest	Total	Damage to Forest Growth: Mature Timber M.B.F. Killed	M.B.F. Salvable	Regrowth, Acres
Montana	4	32	36	251,100	50	71,400
Idaho	12	9	21	854,000	165,000	197,600
Washington	69	84	153	198,000	71,100	206,100
Oregon	80	98	178	278,200	87,900	211,000
California	118	245	363	313,700	590	137,100
Totals	283	468	751	1,895,000	324,640	823,200

* Includes 2,400,000 acres O. and C. land. † Includes $43,300 O .and C. and $2,600 public lands. ‡ Includes only F. R. D. and R. and T. expenditures justifiable from a protection standpoint.